ARBOR DAY
ITS HISTORY AND OBSERVANCE

U. S. DEPARTMENT OF AGRICULTURE.

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BY

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LETTER OF SUBMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
Washington, D. C., January 29, 1896.

SIR: I have the honor to submit the accompanying bulletin on Arbor Day, prepared by your direction.

Its aim is to give an authentic account of the origin, history, and uses of the day—now observed throughout our country and also in other lands—which has been regarded with interest by the Department ever since its observance began, and to offer such suggestions and helps as may serve to increase its usefulness.

It is impossible to sketch the history of Arbor Day in even the briefest manner without frequent reference to the present Secretary of the Department, with whom the day is so intimately connected. If the writer of this bulletin had felt at liberty to disregard the restraints imposed by the official character of the work, a much more frequent mention of Mr. Morton's name would have been the result.

Some of the illustrations in the bulletin, especially those of leaves, are from Apgar's Trees of the Northern United States, copyright, 1892, by the American Book Company, to whom thanks are due for permission to use them, it having been found impracticable to prepare original figures of this character without delaying the bulletin until after the arrival of the time set apart in many States for the observance of Arbor Day. Similar thanks are due to others also for like favors.

I take occasion here also to thank the superintendents of public instruction and others who have so readily and courteously responded to my invitation and rendered aid, by suggestion or otherwise, in the preparation of this publication. Wherever material from such or other sources has been incorporated in these pages I have endeavored to give credit to the respective authors. For the rest the writer is responsible.

Respectfully,

N. H. EGLESTON.

Hon. CHAS. W. DABNEY, Jr.,
Assistant Secretary.

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INTRODUCTION.

Arbor Day, from being only a humble expedient of one of our Western States a few years ago, has become a national holiday and one of our important institutions. Its original design has been modified since its observance has become associated with our schools. It is now not only a day for tree planting for economic and æsthetic purposes, but its observance has been made the means of securing much valuable knowledge in regard to plant and tree life, of cultivating in the young the powers of observation, and kindling in their minds an interest in natural objects which will be a lifelong source of benefit and pleasure.

Is it too much to hope, also, that this Arbor Day festival, engaging our children in its observance so generally and so pleasantly with songs, recitations, and the planting of trees and shrubs around the schoolhouses and along the streets or in public parks and other places, may have the effect of developing in coming generations a keener appreciation of the value and the beauty of trees than has hitherto been felt in our country, and that thus the reckless destruction of our forests, now going on with such threatening consequences, may be arrested before the calamities are upon us which have befallen other countries through the loss of their trees?

ARBOR DAY: HISTORY AND OBSERVANCE.

COMMERCIAL VALUE OF TREES.

Arbor Day has its abundant justification in the surpassing value of trees from whatever point of view they are considered. Their beauty is felt by all. Nothing contributes so much to make the world a pleasant place of abode for man. Just as anyone has the true home feeling and seeks to create a home for himself, he seeks the trees as being an indispensable aid in the accomplishment of his purpose. He must have the trees around his dwelling place. He must have their shelter and their shade, their beauty of form, of leaf, and blossom, and fruit, their ever-varying aspect with every change of earth and sky, of sunshine and cloud. In short, he must have their companionship in his daily life. But looked at apart from all such feeling and sentiment, looked at not in their living but in their dead state, looked at as mere lumber or material for man's constructive purposes, for the thousand uses of daily life, the trees have an almost incomparable value. Estimated by their money value alone the products of the forest exceed those from almost any other source.

We speak of the "precious metals," gold and silver; and they are so precious in the esteem of most persons that multitudes are ready to forsake all other occupations and rush in pursuit of them wherever they may be found or there is even a faint hope of finding them. Now we give to the hunters of these precious metals special privileges in the prosecution of their quest such as are not given to people engaged in other employments. It would seem that the mining of gold and silver is the most important interest of the country. It certainly holds a very prominent position in the public estimation.

But the last report of the Director of the Mint gives the value of the product of the gold and silver mines of the United States for the year 1894 as follows: Gold, $39,500,000; silver, $31,422,000; total, $70,922,000. At the same time, the most recent and careful estimates of the value of

the products of our forests during the same year make it $1,058,650,859, or fifteen times that of gold and silver.

Another comparison is very significant. If we add to the gold and silver products that of all other minerals, including such prominent ones as iron, copper, lead, zinc, coal, lime, natural gas, petroleum, salt, slate, building stones, and the twenty-five or more remaining, which are less important, we shall have for the value of all our mineral products obtained during the year 1894, $553,352,996, or only about one-half the value of our forest products.

Again, we may make a comparison in a different direction and with no less striking results. The statistical report of the Department of Agriculture gives the value of our cereal crops for the year 1894 as follows:

Wheat	$225,902,025
Corn	554,719,162
Oats	214,816,920
Rye	13,395,476
Barley	27,134,127
Buckwheat	7,040,238
Total	1,043,007,948

or less by $15,000,000 than our one forest crop.

Is it not worth our while, therefore, to perpetuate if possible such a crop, and to guard against anything which threatens to diminish it? Ought we not, by every means within our control, to see that the source of this most valuable supply is not lessened in its capability of yielding such a preeminently valuable contribution to our welfare and comfort?

The need of tree planting, looked at in the wide view, results from the fact that we have been and are depleting our forest area at an unreasonable rate. The spread of population into the great treeless plains beyond the Mississippi has made a largely increased demand for lumber, and in response to that demand we have been for years consuming our forests at a rate far beyond the supply furnished by their annual growth. The best estimates make the annual consumption of our forests, for fuel and lumber chiefly, 25,000,000,000 cubic feet. To furnish this amount would require the produce of the annual growth of 1,200,000,000 acres of woodland, whereas our total forest area is less than 500,000,000 acres, which is no more than we need as a permanent stock of woodland for the country. It will be seen, then, that more than half of our annual consumption is a draft by so much upon our forest capital, when we should be only drawing from the forests the amount of their annual growth, or the interest of that capital. How long would it take a millionaire to become a bankrupt if he should be annually trenching upon his money capital at a like rate?

Few persons realize the enormous and often wasteful—that is, unnecessary—consumption of our forests. That consumption amounts

to 350 cubic feet per capita, as against 12 to 14 cubic feet per capita in Great Britain and about 40 cubic feet in Germany.

Some specifications may help us to apprehend the situation. Our railroads consume, on an average, annually for their construction 500,000,000 cubic feet of our very best timber. Our mines use for internal props and for the reduction of their ores immense amounts. One mine may be taken as an illustration. The Anaconda Mining Company, of Montana—well named Anaconda, in view of its enormous capacity for swallowing the forests whole, as it were—made a statement four years ago, now on file in one of the Departments of the Government, from which it appears that during a period of six months it consumed 65,000 cords of wood and 18,500,000 feet of lumber. At the same time the company stated that its daily consumption hereafter would be, wood 700 cords, lumber 100,000 feet, and its consumption for the year 1892 would be, wood 255,000 cords, lumber 40,000,000 feet. This lumber is mostly in the form of timber used as mine props.

Most of the wood and timber used by this and other mines in the Rocky Mountain and other western regions is cut from the public lands. Such is the indulgence shown by the Government that those engaged in mining or even prospecting for mines are allowed to cut and consume the timber on the public lands free of cost and with only such restrictions as may be made by the Secretary of the Interior. These restrictions are not close or narrow in character, and are easily evaded if not absolutely ignored, and so are to a great extent practically inoperative. The scanty appropriations of Congress do not allow the Secretary of the Interior to retain a sufficient number of inspectors to watch the immense extent of territory occupied by the forests and take notice of the depredations which may be made upon them, and even when depredations are occasionally discovered it is very difficult to secure a conviction and inflict the penalty prescribed for the offense.

To show the extent of these depredations and the scale on which the forests are consumed, may be instanced the case of one mining company in Dakota against which the Government has brought suit for the sum of $688,000, this being the alleged value of the trees cut less than 8 inches in diameter, which restriction had been placed upon the permit to cut. What must have been the number and value of the larger trees cut and consumed by this company? The operations of the Anaconda Company are carried on upon so large a scale that it is said they refuse to make a contract for less than 40,000 cords of wood in any single case, and their contracts range from that amount to 200,000 cords, while nearly 1,000,000 cords are constantly kept on hand. The company held last year a permit from the Secretary of the Interior to cut from four sections of public land within twelve months 14,000,000 feet of timber. The great Comstock Lode of Nevada is, if possible, a greater anaconda, whole mountains of forest having gone into its capacious

maw, the growth of two or three centuries having been swept away in a few years.

Figures are impotent to give one a full apprehension of the work of forest destruction that is wrought by these and other mining companies and the lumbering establishments which help them to their supplies. One needs to see with his own eyes the work as it is going on and the track of desolation which it leaves, to have an adequate notion of the destruction thus accomplished. One company, miscalled a development company, which is one of the agencies through which the Anaconda secures its supplies, has a daily capacity of 120,000 feet of timber.

It is to be considered also that not only the consumption of the forests incidental to mining operations but that resulting from ordinary lumbering is marked by great wastefulness. We throw away often more material than we use. A great portion of the substance of the trees cut in the forests is left there to decay or to be consumed by the flames. It is estimated that on the average not more than three-eighths of what we cut in the forests is utilized, five-eighths of the material being wasted. In the great redwood forests of the Pacific Coast such is the wasteful method of operation, it is said, that in procuring a railroad tie worth 35 cents, $1.87 worth of the substance of the tree is wasted. In Europe it is estimated that seven-eighths of the forest material is made use of and the waste is only one-eighth.

A conspicuous case of wastefulness is worth noting in this connection, not only as an instance of wastefulness, but for the great and direct damage resulting from it. To meet the demands of a great mining company on one of the Sierra Nevada ranges a band of men, numbering thousands in all, were sent with their axes into a forest district in that vicinity. It was an extensive region and the forest presented a stand of trees not excelled, perhaps, in quality in all the country. Every condition of climate and soil had been favorable for their growth. They stood thick and stalwart.

As the quickest and easiest way of getting out the largest trees, which were the ones wanted for the miners' use, the forest was cut clean and leveled with the ground. Then, the timber having been removed, the remaining trees, spread over miles and miles of the mountain side, were given to the flames. The fire not only consumed the trees, but burned up the soil beneath them—the rich leaf mold, which was the accumulation of centuries of tree growth. The very rocks beneath it were so heated by the mighty mass of burning fuel that, in many places, they crumbled to gravel. When the rains came and the snows melted rapidly in springtime—having no sheltering foliage of the trees to protect them from the rays of the sun—the ashes of the burned trees, and what was left of the soil, together with the rocky gravel, were swept down the mountain side with torrent swiftness and force, overflowing the banks of the water courses, tearing

them from their places, and pouring out the débris of disintegrated rock upon the fertile meadows below to the depth of many feet.

The settlers in the peaceful valleys at the foot of the mountains, to whom the dense forests had sent from their saturated spongy soil and the slowly melting snows under their protecting shade a steady and sufficient supply of water to enable them to prosecute their farming operations in that arid region with an assurance of success nowhere surpassed, now found themselves at the mercy of torrents in the spring season and droughts in the summer time, and were forced to abandon their no longer productive farms. Those green mountain slopes which it had taken centuries of growth to prepare as the guarantee of fertility to the fields below are gone. Naked rocks only are now to be seen in their place. It will take centuries to clothe them again with trees, and meanwhile the valleys and plains below will remain the desert which the greed and recklessness of man have created there.

With the enormous consumption of our forests now going on and rapidly increasing and the consequent diminution of our forest area, the need of tree planting becomes greater with every passing year, and the importance of Arbor Day constantly increases. Its great value, as has been said, is not so much in the number of trees planted on Arbor Day as in the tree sentiment created and stimulated by the Arbor Day observances, which will be helpful in arresting the wasteful destruction of our forests and lead on in due time, it is to be hoped, to all private and public tree planting which our interests demand.

ORIGIN AND HISTORY OF ARBOR DAY.

The first to call attention in this country, in an impressive way, to the value and absolute need of trees—their value not merely on account of their beauty or their adaptation for purposes of ornamental planting and mechanical utility, but for their connection as forests with climatic influences, with the flow of streams, and their consequent connection with the large interests of agriculture and commerce, in short, with the general welfare of all classes of people—was that eminent scholar and wise observer, Mr. George P. Marsh, for many years our worthy representative at the courts of Italy and Turkey. His residence in those older countries was calculated to draw his attention to the subject as it would not have been drawn had he always lived in his native land.

Ours was a remarkably well-wooded country. From Maine to the Gulf and from the Atlantic coast to the Alleghanies stretched an almost continuous forest, which at the beginning of white settlements

here and long afterwards was an impediment to agricultural development. The pioneer was obliged to clear a space among the trees to make room in which to cultivate his crops, and it is a significant sign of that early condition of things that the coat-of-arms of one of our States bears the emblem of a sturdy yeoman with uplifted ax. Under such circumstances, it is no wonder that the people of this country in former time had no very favorable estimate of trees and little appreciation of their value, except for fuel and the supply of timber for house building and certain other uses, or that they were willing that their consumption by the ax should be aided and accelerated by forest fires. Comparatively few persons until a recent period realized the serious inroads which, with a rapidly increasing population, had been made upon our forest resources or apprehended the dangers which were threatening us in the future as the consequences thereof.

In Europe Mr. Marsh found the Governments of Italy and Germany, as well as those of other countries, making active endeavors and at great expense to rehabilitate their forests which had been depleted centuries before, to guard them from depredation and, instead of leaving them to be consumed at the bidding of personal greed or recklessness, cherishing them as among their most precious possessions. He found the forests regarded as the most valuable crop which the ground can produce, and every effort made to stimulate their growth to the utmost. He found schools, of a grade corresponding to our colleges, established for the special purpose of training men for the successful planting and cultivation of forests. He found the growth of trees in masses and their maintenance reduced to a science and the management of the woodlands constituting one of the most important departments of state.

Such discoveries were well calculated to fix his attention upon the very different condition of the forests in his own country, and to convince him that the reckless destruction of them then going on here, if not checked, would bring upon this land the same calamities which had befallen countries of the Old World in past centuries, and from which only the most enlightened nations of Europe are now recovering through the arduous efforts of many decades, and at great pecuniary cost. The result of Mr. Marsh's observations was the publication of a volume entitled "The Earth and Man," and that admirable chapter in it on "The woods," to which, more than to any other source perhaps, we are indebted for the awakening of attention here to our destructive treatment of the forests, and the necessity of adopting a different course if we would avert most serious consequences, threatening more than anything else, possibly, our material welfare.

Other thoughtful and observing men at home became aware from time to time that we were wasting our tree heritage, and in one way or another they were urging the necessity of caution and economy in the treatment of the forests. It is remarkable, indeed, that as early as the colonial period some of our States—New Hampshire and New York, for

example—became somewhat alarmed by the inroads which were even then being made upon their forests, and made enactments for their protection. This action was exceptional, however, and little was done to draw attention to the rapid and dangerous depletion of our forests and awaken public sentiment on the subject until within the comparatively recent period of which we have just spoken.

For the purpose of securing a supply of timber for naval construction the Government, at the beginning of the present century, purchased certain tracts of live-oak timber, and about twenty-five years later, by an act of Congress, the President was authorized to take measures for their preservation. About the same time the Massachusetts Society for Promoting Agriculture offered prizes for forest planting, and thirty years later the State ordered a survey of her timber lands. Thirty years later still, acts began to be passed for the encouragement of timber planting, chiefly in the treeless Western States. The well-known timber-culture act was one of these. It made a free gift of the public lands to the successful planter of forest trees on one-fourth of his entry.

About twenty years ago the subject of forest destruction and its detrimental results came before the American Association for the Advancement of Science for consideration, and as the result of its discussions the association memorialized Congress, asking that measures be taken for the protection of the public timber lands. In consequence of this, a committee of the House of Representatives was appointed for the purpose of considering the establishment of a forestry department of the Government, and two years later the Commissioner of Agriculture was authorized to appoint a forest commissioner, which was the foundation of the present Forestry Division in the Department of Agriculture. The commissioner, the late Dr. F. B. Hough, made protracted inquiries into the condition of the forests in this country and in Europe, and published a voluminous report on the subject, which is altogether the most complete and valuable publication on forestry which has appeared in this country.

It was at about this time, or a few years earlier, that a practical movement was inaugurated by the present Secretary of Agriculture, the Hon. J. Sterling Morton, which has done more for the protection of our forests and the encouragement of tree planting than all our legislation. This was the establishment of Arbor Day, or tree-planting day. It was the happy thought of this pioneer settler on the treeless plains of Nebraska, who knew and felt the value of trees about the home, as well as their importance for the many uses of life, to enlist his neighbors and his fellow settlers throughout the State, by a common impulse, growing out of common wants and feelings, in the work of tree planting on one and the same given day. The wise suggestion was brought before the State board of agriculture in the form of a resolution designating a certain day for the inauguration of the tree-planting movement. The resolution was readily adopted. The appeal to the popular feeling and

the popular need was heartily responded to, and it was reported that many millions of trees were planted that year in Nebraska. This successful inauguration of Arbor Day led to its institution the same year by the horticultural society in Iowa, to be followed quickly by its adoption in Minnesota, Ohio, and other Western States.

A few years later Arbor Day assumed a new character and acquired a wider interest with the people as it became connected in its observance with the public schools. This it did for the first time during the sessions of a national forestry convention at Cincinnati in the year 1882. The sessions of the convention were continued through five days, on one of which there was a public parade, civic and military, with a march to Eden Park, where groves were planted and single trees in memory of distinguished men—poets, orators, governors, and others. The school children and their teachers formed a conspicuous feature of the pageant and the planting of the trees was done principally by them. Tree planting thus became a festivity, combining at once pleasure and utility. That Cincinnati observance was an object lesson for the country, as the report of it was published far and wide.

A national forestry association was formed at the time of the Cincinnati convention, and at its meeting in St. Paul the following year a resolution was adopted favoring the observance of Arbor Day by the schools of the country. A standing committee on Arbor Day was also appointed, and such a committee has been appointed at nearly every annual meeting of the association. Wherever since then Arbor Day has been adopted its observance has been connected with the schools, as it has been also in the States where it had been established before. Thus it has become a school festival, as it has also become a national one. It was only what might have been expected, therefore, that at the meeting of the National Education Association, at Saratoga, in July, 1892, when the subject had been brought to its attention by the Hon. B. G. Northrop. the committee to whom it was referred should report as follows:

> Your committee reports with pleasure that Arbor Day is now observed in accordance with legislative act, or annual public proclamation, in forty States and Territories. We recommend that the observance be universal, that village and district improvement associations be formed, that memorial trees be planted, and that appropriate means be employed to inspire in pupils and parents the love of beauty and a desire for home and landscape adornment.

Arbor Day is educational in the best and largest sense. By engaging the pupils of the schools in the study of trees, not merely from books but by actual observation and handling of them in their living state, the observing faculties of the pupils are appealed to and cultivated, and their minds are easily led on from the study of trees to that of shrubs and flowering plants and all natural objects. There can be no better training than this. It forms one of the best equipments for success in life in whatever employments one may be engaged, and is a

never-failing source of enjoyment. No studies are more wholesome than those of natural objects. They are suggestive of only what is good. They cultivate the sense and love of the beautiful everywhere. They meliorate the nature within us and fit us to be associates with one another, and to become worthy members of society wherever we may be.

And so Arbor Day and its public observance, taken with the studies connected with it, has led on naturally to the formation of town and village improvement societies and various other associations and organizations for the promotion, in one way and another, of the public welfare. The spirit of Arbor Day is benevolent. Its aim is the public good in some form, and it has a wide outlook. There is nothing narrow or selfish about it. If it plants trees, it is not for the benefit of any individual alone, but for all who may see them and have the benefit of them, whether soon or centuries hence. It plants for those who are to come, as well as for those now living.

Arbor Day is the one festival or celebration which, instead of looking backward and glorifying the heroes and achievements of the past or recounting the praises of present enterprises or actors, looks forward and seeks to make a better environment and a better inheritance for the coming generations. Its spirit is hopeful. Its motto is progress. It is ever reaching out for new acquisitions of knowledge, and seeking to impart new and more widespread benefits.

It is not a matter for wonder, therefore, that an institution with such a spirit and such possibilities, with so much to commend it to the attention of persons of intelligence and generous feeling, and especially to the ardent natures of the young, should have a speedy and wide acceptance. And so, by its own manifest merit and without any propagandism on its behalf, it has been adopted by nearly every State and Territory of the Union; and limited by no national boundaries, it has even crossed the Atlantic on the one hand, and become established in Great Britain, France, and northern and southern Africa, and on the other, within the present year, has crossed the Pacific and been welcomed in the Hawaiian Islands and in Japan.

The beneficent results of an institution of this character, and already almost world-wide in its reach, no one can measure. Year by year it will bring millions of people, young and old, into a closer and more intimate contact with nature, unveiling to them its precious secrets, opening to them stores of valuable knowledge, and cultivating in them the best feelings. In our own country it promises to do more than anything else to convert us from a nation of wanton destroyers of our unparalleled heritage of trees to one of tree planters and protectors. Instead of looking upon the trees with indifference, or even with a hostile feeling, as to a great extent we have done, or regarding them chiefly as material for use in the constructive arts or to be consumed as fuel, we shall become tree lovers. A tree sentiment will be created and established which will lead us to recognize and cherish the trees as

friends, and while we shall freely make use of them in the various arts and industries of life, we shall be mindful of their value in other respects and find constant delight in their companionship.

To show the natural result of the establishment of Arbor Day and how it increases its hold upon the regard of a people from year to year as it becomes more and more familiar to them and its obvious lessons are learned by them, it is enough to adduce the history of Nebraska, in which the day originated—since the time it began to be celebrated there. Arbor Day originated in this manner: At an annual meeting of the Nebraska State board of agriculture held in the city of Lincoln, January 4, 1872, J. Sterling Morton, of Nebraska City, introduced the following resolution, which was unanimously adopted after some little debate as to the name, some of those present contending for the term "Sylvan" instead of "Arbor:"

Resolved, That Wednesday, the 10th day of April, 1872, be, and the same is hereby, especially set apart and consecrated for tree planting in the State of Nebraska, and the State board of agriculture hereby name it Arbor Day; and to urge upon the people of the State the vital importance of tree planting, hereby offer a special premium of one hundred dollars to the agricultural society of that county in Nebraska which shall, upon that day, plant properly the largest number of trees; and a farm library of twenty-five dollars' worth of books to that person who, on that day, shall plant properly, in Nebraska, the greatest number of trees.

The result was that over a million trees were planted in Nebraska on that first Arbor Day.

Three years later the day had attained such favor with the people that the governor, by public proclamation, set apart the third Wednesday of April as Arbor Day, and recommended that the people observe it as a day of tree planting. Annually thereafter other governors of the State followed this example, until at the session of the legislature in 1885 an act was passed designating the 22d day of April, the birthday of Mr. Morton, as the date of Arbor Day, and making it one of the legal holidays of the State.

As further showing the deep lodgment which Arbor Day has gained in the regard of the people of Nebraska, and the interest with which it is cherished by them, it is significant to notice that since the inauguration of Arbor Day a provision has been embodied in the constitution of the State which recites, "That the increased value of lands by reason of live fences, fruit, and forest trees grown and cultivated thereon shall not be taken into account in the assessment thereof."

The following statutory enactments are now in existence also:

SEC. 3. That the corporate authorities of cities and villages of the State of Nebraska shall cause shade trees to be planted along the streets thereof.

SEC. 4. For the above purpose a tax of not less than one dollar nor more than five dollars, in addition to all other taxes, shall be levied upon each lot adjacent to which the trees are to be planted as aforesaid, and collected as other taxes.

SEC. 5. Trees shall be annually planted, when practicable, on each side of one-fourth of the streets in each city and village in the State of Nebraska, until all shall have shade trees along them not more than twenty feet apart.

SEC. 6. The corporate authorities aforesaid shall provide by ordinance the distance from the side of the street that trees shall be planted, and the size thereof.

SEC. 7. *Provided*, The owner of any lot or lots may plant trees adjacent thereto where ordered as above, in the manner and of the size prescribed, and on making proof thereof by affidavit to the collector, said affidavit shall exempt said owner from the payment of the aforesaid tax.

SEC. 8. Any person who shall materially injure or shall destroy the shade tree or trees of another, or permit his animals to destroy them, shall be liable to a fine of not less than five dollars, nor more than fifty dollars for each tree thus injured or destroyed, which fine shall be collected on complaint of any person or persons before any court of proper jurisdiction. One-half of all fines thus collected shall be paid to the owner of the trees injured or destroyed; the other half shall be paid into the school fund.

SEC. 9. That this act shall not apply to any person that is occupant of any business lot without his consent.

SEC. 10. That when any person shall plant and properly cultivate for the term of five years, six rows of trees, eight feet apart, and the trees four feet apart in the row along either the north section or the half section line, running east and west, said rows to be not nearer to the said north section or half section line than four feet or to the south line of any road which may be laid out on said north section or half section line; or when any person shall fill out to the standard above prescribed, and keep the same in a proper state of cultivation for the time above stated, any rows of trees that may have previously been planted along said north section or half section line, it shall be the duty of the county commissioners to pay such person, by warrant on the county treasurer, a sum of money, amounting to three dollars and thirty-three cents per acre, for each acre so planted and cultivated annually, so long as the same is planted and kept growing and in a proper state of cultivation, for a period not to exceed the space of five years, and to an extent not to exceed three acres of land.

SEC. 11. It shall be the duty of the assessor of each precinct to make proper examination and report to the county commissioners, at the time of his annual report, the condition of all timber so planted and cultivated under the provisions of this act.

How firmly the tree-planting idea has taken hold of the people of Nebraska is further shown by a joint resolution adopted by the last legislature, and approved April 4, 1895:

Whereas the State of Nebraska has heretofore, in a popular sense, been designated by names not in harmony with its history, industry, or ambition; and

Whereas the State of Nebraska is preeminently a tree-planting State; and

Whereas numerous worthy and honorable State organizations have, by resolution, designated Nebraska as the "Tree Planter's State;" Therefore, be it

Resolved by the legislature of the State of Nebraska, That Nebraska shall hereafter, in a popular sense, be known and referred to as the "Tree Planter's State."

To this may be added, not inappropriately, another joint resolution adopted at the same session, which is an outgrowth of the same sentiment as that which led to the adoption of the popular name, "Tree Planter's State."

Whereas, the adoption of a State floral emblem by the authority of the legislature would foster a feeling of pride in our State and stimulate an interest in the history and traditions of the Commonwealth: Therefore, be it

Resolved, That, the Senate concurring, we, the legislature of Nebraska, hereby declare the flower commonly known as the "Golden Rod" (*Solidago serotina*) to be the floral emblem of the State.

Approved April 4, A. D. 1895.

The Hon. Henry R. Corbett, State superintendent of public instruction, says:

The effect of Arbor Day it will be impossible to estimate in figures or statistics. It has resulted in stimulating a pride in the resources of Nebraska and a sentiment in favor of extending and preserving our forest areas. It is observed and talked about in every school room, and through its influence millions of trees have been planted and cared for annually throughout the State.

To these testimonies may be added the following recent statement of the Hon. R. W. Furnas, who, as governor of Nebraska, issued the first Arbor Day proclamation and who has watched with interest the progress and results of the day's observance ever since:

No observance ever sprang into existence so rapidly, favorably, permanently, and now so near universally throughout the whole civilized world as that of "Arbor Day." It originated less than a quarter of a century since, and has been adopted, in some form or other, in all the States and Territories of this Union, and in nearly all foreign civilized countries, increasing in popularity wherever known.

The words "Arbor Day" are attractive to the eye—to read in print and to meditate; they are rythmical to utter and to the ear. The word "Arbor" carries with it most pleasant remembrances to the young and promise to the older—"a bower, a seat shaded by trees." What more enticing and enchanting to refined æsthetic taste and mind than such retreat, such rest, shelter, protection? This characteristic alone makes it worthy of a permanent place in our civilization.

Its economic worth, because of its usefulness among all classes of people, commends it with equal force.

Its origin was prompted by a desire to ward off the rigorous winds of northwestern prairies, and to supply fuel as well. Its accomplishments in this respect are already beyond pecuniary computation. Through the instrumentality of its observance in Nebraska many thousands of acres hitherto bleak, worthless, undesirable prairie lands have been clad with millions of trees, thus converting them into valued forest groves, fruitful orchards, prosperous homes, with happy people as occupants. A great commonwealth has been built on the foundation "Arbor Day," and within the recollection of those who participated in "laying the corner stone."

The influence of tree planting on the western prairies, influencing climate conditions for good, is found to be next to incalculable—retaining moisture and breaking the force of sweeping winds. Growing out of this climatic revolution is the greater result of increased crop products.

Records show the number of trees planted in Nebraska since the inauguration of "Arbor Day" running into billions. Instances are also of record, where the earlier planted and more rapid growing varieties of trees which were used have been already converted into sawed lumber, of which residences and other buildings have been constructed.

It has been deemed proper to present in this extended manner an account of the inauguration, establishment, and progress of the Arbor Day institution in Nebraska as an illustration not only of what the observance of the day has effected in a particular State, but of what it is effecting in many other States and may be expected to do wherever it is established.

To show that similar results have followed the introduction of Arbor Day in other States, it will be enough to cite briefly the testimony of a few superintendents of public instruction, persons who possess the best means of information upon the subject.

Superintendent Sabin, of Iowa, well known for the great interest he has taken in the proper observance of Arbor Day, says:

Arbor Day has been regularly observed in Iowa since it was instituted in 1887. It is the custom of this department to issue an Arbor Day annual for free distribution. Special care is taken that one reaches every school in the State.

Although there is no legal requirement, the day is very generally observed by the schools, and in many cases by citizens. It is proper to say here that our school law requires every board of directors to set out and properly care for at least twelve shade trees on each school grounds not already provided with suitable shade.

The influence of such an observance is very excellent, although, as in other good work, perseverance is necessary to success. We intend to continue the custom from year to year.

The superintendent of public instruction in Wyoming says:

The day is observed by the planting of trees and appropriate exercises in each department of our schools.

A great degree of interest is manifested by the children and people generally and seems to be increasing. Pupils look forward with great pleasure to the planting and naming of their trees. In a great many schools each child contributes toward the buying of a tree, and in after years watches its growth very carefully.

Particular interest, I think, is shown in this day in Wyoming for the reason that we have so few native trees and it requires so much care to cultivate them.

E. B. Prettyman, secretary of the Maryland board of education, says:

The day is observed universally by the public schools of the State. Great interest is manifested, which I believe to be increasing. I believe the effect of the observance of Arbor Day is very beneficial in cultivating a love for trees and for the adornment not only of school lots with trees, vines, and flowers, but that this cultivation extends to the families and homes represented in the schools.

Hon. J. M. Carlisle, superintendent of public instruction in Texas, says:

Washington's birthday, February 22, is observed in this State as Arbor Day. It is observed as a holiday, and is devoted to the planting of trees, shrubs, flowers, and the general ornamentation of public buildings and grounds. The patriotic exercises appropriate to Washington's birthday blend beautifully with the observance of Arbor Day.

The effect of the observance of the day is wholesome. Interest in the study of trees, shrubs, and flowers is stimulated, appreciation of the wonders and beauties of nature is heightened, and the sentiment in favor of both physical and moral cleanliness is greatly strengthened, while patriotic feelings are aroused and the people are drawn together by the contemplation of so many great themes in which all have a common interest.

The superintendent of public instruction in North Dakota says:

The degree of interest in the observance of the day is increasing, and the effect upon pupils of the schools and the public generally is gratifying in the same degree which marks the increasing observance of the day.

Hon. A. B. Poland, State superintendent of public instruction in New Jersey, says:

Ever since the adoption of the act for the observance of Arbor Day (1884) the observance has been universal throughout the State, and, in general, eminently satisfactory. I am of the opinion that, after eleven years' experience, the interest taken in the observance of Arbor Day has in no respect diminished. This would be a remarkable phenomenon were it not that the end subserved were generally recognized to be a useful one.

I am of the opinion also that the participation of the schools and, to a considerable extent, the citizens in the observance of Arbor Day has resulted in a moral and æsthetic improvement that may be clearly discerned.

New York was late in adopting Arbor Day by legal provision, though the day had been more or less observed for several years; but no State, since the enactment of the "act to encourage arboriculture" (1888), has been more active or efficient in the observance of Arbor Day. Hon. Charles R. Skinner, State superintendent of public instruction, speaking of the passage of the act, says:

Without doubt one of the effects of this legislation has been to arouse a deeper interest in trees and flowers among pupils and people. We hear more in these days concerning the preservation of our forests than before the enactment of the law. Our school grounds are kept in better condition and the trees about our schoolhouses are better protected. In thousands of cases trees so planted on Arbor Day have been named for men and women prominent in education and in our history generally.

The manuals which have been issued by the department of public instruction from year to year, and the larger and very noteworthy manual compiled by Mr. Skinner himself, testify abundantly to the vigor with which the Arbor-Day propaganda has been promoted in New York. Those manuals have been freely drawn upon in the preparation of the present publication.

The number of trees planted in New York on Arbor Day is officially stated by Mr. Skinner as follows: 1889, 24,166; 1890, 27,130; 1891, 25,786; 1892, 20,622; 1893, 15,973; 1894, 16,624.

STATES AND TERRITORIES OBSERVING ARBOR DAY.

States.	Year of first observance.	Time of observance.
Alabama	1887	22d of February.
Arizona	1890–91	First Friday after 1st of February.
Arkansas	.....	
California	1886	
Colorado	1885	Third Friday in April.
Connecticut	1887	In spring, at appointment of governor.
Florida	1886	January 8.
Georgia	1887	First Friday in December.
Idaho	1886	Last Monday in April.
Illinois	1888	Date fixed by governor and superintendent of public instruction.
Indiana	1884	Date fixed by superintendent of public instruction.
Iowa	1887	Do.
Kansas	1875	Option of governor, usually in April.
Kentucky	1886	Do.
Louisiana	1888–89	Option of parish boards.
Maine	1887	Option of governor.
Maryland	1889	Option of governor, in April.
Massachusetts	1886	Last Saturday in April.
Michigan	1885	Option of governor.
Minnesota	1876	Do.
Mississippi	1892	Option of board of education.
Missouri	1886	First Friday after first Tuesday of April.
Montana	1887	Third Tuesday of April.
Nebraska	1872	22d of April.
Nevada	1887	Option of governor.
New Hampshire	1886	Do.

STATES AND TERRITORIES OBSERVING ARBOR DAY—Continued.

States.	Year of first observance.	Time of observance.
New Jersey	1884	Option of governor, in April.
New Mexico	1890	Second Friday in March.
New York	1889	First Friday after May 1.
North Carolina	1893	
North Dakota	1884	6th of May, by proclamation of governor.
Ohio	1882	In April, by proclamation of governor.
Oklahoma		
Oregon	1889	Second Friday in April.
Pennsylvania	1887	Option of governor.
Rhode Island	1887	Do.
South Carolina	Uncertain.	Variable.
South Dakota	1884	Option of governor.
Tennessee	1875	November, at designation of county superintendents.
Texas	1890	22d of February.
Vermont	1885	Option of governor.
Virginia	1892	
West Virginia	1883	Fall and spring, at designation of superintendent of schools.
Wisconsin	1889	Option of governor.
Wyoming	1888	Do.
Washington	1892	Do.

Only the following three States or Territories fail to observe Arbor Day: Delaware, Indian Territory, and Utah. In Delaware the day is observed in some localities, and the same is probably true in Utah and the Indian Territory.

ARBOR DAY CELEBRATIONS.

While the object of Arbor Day, as originally instituted, was to secure the planting of trees on a large scale and for economic purposes, in a region nearly destitute of trees and where the need of them for fuel as well as for shelter was strongly felt, now that its observance has spread all over the country and has become almost universally connected with the schools, nowhere is the day welcomed with more of zest and enjoyment than in those parts of the country where trees are most abundant.

The value of Arbor Day observances in connection with our schools, therefore, is not to be measured so much by the number of trees planted at a given time as by the tree spirit implanted in those engaged in the observance, by the knowledge of tree life incidentally gained, and the feelings and principles engendered or promoted and their after influence upon life and character. The value of Arbor Day is not so much in its present enjoyments for a day as in what it does by preparing our growing youth to be useful and happy men and women when they reach the position of influence and responsibility, when the duties of public and social life and the molding and direction of social and political affairs are to be transferred from those who now control them and are to be assumed by themselves.

It is much in favor of the day and its appropriate observance that it may afford such opportunities for bringing the young so pleasantly into contact with Nature, and opening their minds in their most impressible time to her healthy and happy influences. It is good to take the pupils out of the schoolroom for a day into the open air, into Nature's school place. And it would be a good thing if they could be taken into the fields and groves, under the judicious guidance of their teachers, not only once a year, but oftener. An occasional half-holiday thus taken would be of more real benefit, more instructive, than any equal portion of time spent in the schoolroom. It would be taking the children to the original fountains of knowledge, where they would gain it at first and not at second hand. Fresh flowers are better than those of the herbarium. It would give scope and stimulus to their observing faculties, the first to open and the first which offer themselves to be trained for proper use, on whose proper use also the success and happiness of after life chiefly depend. As Wordsworth says:

Nature never did betray
The heart that loved her; 'tis her privilege,
Through all the years of this our life, to lead
From joy to joy; for she can so inform
The mind that is within us, so impress
With quietness and beauty, and so feed
With lofty thoughts, that neither evil tongues,
Rash judgments, nor the sneers of selfish men,
Nor greetings where no kindness is, nor all
The dreary intercourse of daily life
Shall e'er prevail against us, or disturb
Our cheerful faith that all which we behold
Is full of blessing.

It had been a thousand times better for some if, instead of moiling over books in the schoolroom, they had been allowed to spend more of their younger days in the open world, the school of Nature, to be companions of the birds, listening to their songs and learning their habits, strolling along the brooks, following their windings through wood and meadow, and coming home laden with the treasures which Nature is ever ready to bestow upon the youngest child or the oldest man who has an eye to see and a heart to feel their beauty.

Happily, the methods of the schoolroom are better than they were, though there is still room for improvement. Nature studies have found some place in them. But these would be made more interesting and more effective if teacher and pupils together were oftener to get face to face with Nature herself, the great teacher.

METHODS OF OBSERVING ARBOR DAY.

The observance of Arbor Day may be as various in method as the tastes and inclinations of those engaged in it. Much will depend upon the teacher; much, also, upon the character of the school and the age and previous training of the pupils. If the teacher has a moderate share of inventiveness there will be little difficulty. The chief thing

is to have the pupils interested in what they do, and if they are taken into confidence by the teacher and invited to offer suggestions, they will often make a plan so sensible and satisfactory as almost to relieve the teacher from any burden of care in regard to it.

Of course it is presumed that the pupils are, to some extent, prepared beforehand for the celebration of Arbor Day by having it spoken of by the teacher and its objects explained, and that there has been more or less talk on the part of the teacher and readings about trees and plants and some familiarity with them and with the elements, at least, of vegetable physiology. It is supposed also that the history and character of distinguished persons in honor of whom it is proposed to plant trees will have been studied.

As the time of celebration draws nigh, therefore, let there be a conference between teacher and pupils as to the method to be adopted. First, as to the tree planting. Where is it to be—on the school ground or on some highway, or in some park? Is it to be done by the school or schools alone, or in cooperation with a larger general movement of the inhabitants of the place for the improvement of its appearance by a systematic planting of trees on the streets and elsewhere? How many trees will the school undertake to plant? What kinds of trees will they plant? The decision of the last question will depend upon where the planting is to take place and whether it is to be done by the school alone or in concert with others. If the planting is to be upon the school premises, it may be desirable to plant different trees from those which might be selected for the street or the park. If the planting is to be done in concert with others, a village improvement society for instance, then the choice of trees will properly be left to such society.

But these preliminary questions having been decided, in order that all may go smoothly on Arbor Day, and to provide against the impediments of unfavorable weather at that time, it is desirable to have a committee of the older pupils appointed to see that the designated trees are procured beforehand, and that holes are properly prepared for their reception, so that there may be no unnecessary delay at the time of planting.

These arrangements having been made, it remains to be decided with what ceremonies or exercises the tree planting shall be accompanied. The programme in this respect will be more or less elaborate according to the age of the pupils, the customs of the place, and the extent to which the Arbor Day spirit has been already developed. But let it be remembered that this is eminently the children's day, and that we all like ceremonies, on special occasions at least. And if the grown-up man needs drum and fife, epaulets and plumes and banners, and the measured march and countermarch to make his soldiering satisfactory, the children may well be invited on Arbor Day to march along the streets to the music of their own familiar songs, wearing such scarfs and badges as they choose to decorate themselves with, and carrying aloft their banners with the pride of young patriots and scholars.

It will be well for the pupils to assemble with their teachers at the schoolroom in the morning and spend a portion of the day—parents and friends being present also—in listening to addresses from any who may have been invited beforehand to speak to them. Essays may also be read by the older pupils. These may be interspersed with songs and recitations and familiar talks about trees and plants. Later in the day, in the afternoon, perhaps, the planting of the trees will take place, songs, addresses, and recitations accompanying the planting of each tree. The character of the weather will determine how much of the exercises shall take place in the open air and how much in the schoolroom or elsewhere. It is the custom in some places, and a very good custom it is, for all the schools to come together at some central place, after the planting is finished, and for the older people, who have been engaged in tree planting, to meet with them and all report what they have done, and end the day with an hour or two around a well-spread table, and with music, songs, and perhaps pleasant games.

ADDRESSES AND EXTRACTS.

The following address by Hon. J. Sterling Morton, delivered April 22, 1887, at the State University, Lincoln, Nebr., has a fitting place in a manual of Arbor Day:

ARBOR DAY: ITS ORIGIN AND GROWTH.

LADIES AND GENTLEMEN: Just as stars in the sky brighten all the firmament with light, so holidays and anniversaries commemorate exalted characters, recall noble deeds, and perpetuate pure principles, illumine the arena of human life, and light up the higher pathways for manly effort and ambition.

Ordinary holidays are retrospective. They honor something good and great which has been, and, by its exaltation, commend it to the emulation of mankind. Thus the past is made to inspire the present, and the present to reach into and influence the immeasurable and unknowable future.

But "Arbor Day"—Nebraska's own home-invented and home-instituted anniversary—which has been already transplanted to nearly every State in the American Union, and even adopted in foreign lands, is not like other holidays. Each of those reposes upon the past, while Arbor Day proposes for the future. It contemplates, not the good and the beautiful of past generations, but it sketches, outlines, establishes the useful and the beautiful for the ages yet to come. Other anniversaries stand with their backs to the future, peering into and worshipping the past; but Arbor Day faces the future with an affectionate solicitude, regarding it as an artist his canvas, and etches upon our prairies and plains gigantic groves and towering forests of waving trees, which shall for our posterity become consummate living pictures, compared to which the gorgeous colorings of Rubens are tame and insignificant.

The wooded landscape in sunlight and in shadow, which you—in the trees you have planted to-day—have only faintly limned, shall in the future fruition of their summer beauty compel the admiration and gratitude of men and women now unborn,

who shall see with interest and satisfaction their symmetry and loveliness. As one friend hands to another a bouquet, so this anniversary sends greetings and flowers, foliage and fruit, to posterity. It is the sole holiday of the human family which looks forward and not backward.

Arbor Day originated in Lincoln on January 4, 1872. Upon that day the festival was instituted by a resolution of the Nebraska State board of agriculture. It was my good fortune to have thought out this plan for popularizing arboriculture and to have originated the term or phrase "Arbor Day" and to have written, submitted, and advocated that resolution, and thus to have established this anniversary. It will grow in popular esteem from year to year, until finally it shall be observed universally throughout the Union of American States.

It has become the scholastic festival of our times. Common schools, colleges, and universities have taken its practical observance under their own special and intelligent direction. The zeal of youth and the cultured love of the beautiful combine to perpetuate and to popularize it.

That which should survive in America must harmonize with education and refinement. Whatsoever the schools, the teachers, and the pupils shall foster and encourage, shall live and flourish, mentally and morally, forever. Students, scholars, and philosophers have ever been associated with trees and their conservation. The Academeia of Athens where Socrates and Plato taught was only a grove of plane trees. There rhetoric, logic, and philosophy were given to the youth of Greece by those majestic men, whose great thoughts more than two thousand years after their death are still vitalizing and energizing the world of mind. The plane tree that Agamemnon planted at Delphos; the one grown by Menelaus, the husband of Helen of Troy; and that one which so charmed Xerxes with its surpassless beauty, when invading Greece with his great army, that he remained one entire day wrapped in its admiration, encircling it with a gold band, decking it with precious jewels, having its figure stamped upon a golden medal, and by his delay losing his subsequent battle with the Greeks—these are all historic trees and yet strangers almost to the average reader.

But the beautiful avenues and tranquil shades of the grand plane tree, which adorned the Academeia of Athens, are familiar to every student. The voice of Socrates mingled with the music of their waving boughs and Plato mused beneath their far-extending shadows. Thus the first fruits of philosophy are borne to us with the fact that Grecian civilization was a tree-planting civilization. And the transmitted wisdom of those ages illustrates how marvelously trees and learning have always been intimately associated together.

Upon the inner bark, called "liber," of trees came the annals, the lore of all the ancient world's written life inscribed by the stylus. Not only from tree bark has the intellect of man taken the record of its early development, but even the word "library," which embraces all the conserved thoughts of all the thinking ages, comes from the inner bark of a tree. And the word "book," take either derivation you choose, comes from one in German or Saxon or Scandinavian, meaning beech wood, because in the dawn of learning all records were written on beech boards, and the leaf and the folio which make up the book came to us also from the trees.

But leaving ancient times, ceasing to trace tree ancestry from words, and reluctantly remaining silent as to many delightful delusions concerning the sacred groves of Greece and Rome and their storied genii, who gave wisdom to sages and judgment to lawmakers, and skipping likewise all the tree lore and tree metaphor in the Bible—and that is indeed self-denial on an occasion like this—let us see how forests and our English ancestry are indissolubly connected, and how, by the very law of heredity, we should all become amateur foresters.

The Druids first planted forests and groves in England. In the misty twilight between barbarism and civilization the teachers and students of Great Britain were Druids. All their discourses and ceremonies transpired in the oaken groves and

sacred orchards of their own planting, and Pliny declares the word "Druid" to have come from the Greek word *drus*—an oak. And while no Druid oaks now remain, there are still in England many very venerable trees. Among them are the Damory oak, of Dorsetshire, 2,000 years of age; Owen Glendower's oak at Shelton, near Shrewsbury, from the branches of which that chieftain looked down upon the battle between Henry IV and Henry Percy in 1403. The great oak of Magdalen College, Oxford, was a sturdy sapling when nine hundred years ago Alfred the Great founded that institution of learning. It received injuries during the reign of Charles I which at the close of the last century caused its decay and death.

Windsor Forest is notable also for its majestic oaks of great age, one of them known to have withstood more than a thousand years of winter and summer storms. Not many decades have passed since Herne's oak, which had borne that hunter's name from the reign of Elizabeth, was blown down. In the Merry Wives of Windsor, Shakespeare has told its story. Elizabeth, who was first saluted at Hatfield as "the Queen of England," in the shade of the towering trees of oak which line its broadest avenues, greatly encouraged agriculture, and was among the first English-speaking advocates of forestry.

When Columbus was seeking a new world, his crew, anxious and incredulous, even unto mutiny, the waves bore out to his ship twigs and foliage from the forests of the unknown land, giving him hope, faith, victory even, as the dove with the olive branch had carried God's peace to Noah centuries before.

Nearly two hundred years after Columbus came the Puritans, and then began the war upon the woodlands of America. Since then, ax in hand, the race has advanced from the Atlantic Seaboard westward for more than two centuries, devastating forests with most unreasoning energy, always cutting them down, and never replanting them. Hewing their way through the Eastern and Middle States, the pioneers have wantonly destroyed without thought of their posterity millions upon millions of acres of primeval woodlands.

Cleaving right and left through Ohio, Michigan, and Indiana, felling giant trees, rolling them into log heaps and destroying them by fire, emigration emerged upon the treeless plains of Illinois and the Northwest.

Nature teaches by antithesis. When sick we learn to value health; when blind we realize the beneficence, the surprising and delicious sense of sight; when deaf we dream of the music we loved to hear, and melodies forever dead to the ear float through the mind that is insulated from sound like sweet memories of the loved and lost. So these treeless plains, stretching from Lake Michigan to the Rocky Mountains, were unfolded to the vision of the pioneer as a great lesson to teach him, by contrast with the grand forests whence he had just emerged, the indispensability of woodlands and their economical use. Almost rainless, only habitable by bringing forest products from other lands, these prairies, by object teaching, inculcated tree planting as a necessity and the conservation of the few fire-scarred forests along their streams as an individual and public duty. Hence out of our physical environments have grown this anniversary and the intelligent zeal of Nebraskans in establishing woodlands where they found only the monotony of plain, until to-day this State stands foremost in practical forestry among all the members of the American Union.

An arboretum is to tree culture what a university is to mental life. The skilled forester gathers in the former all varieties of trees, studies the habits and requirements of each, and stimulates growth and defines forms by all the appliances of his art. In the universities are collected human intellects of all types and all degrees of strength and quickness. Here, as among the trees, are all the inexorable and ineffaceable results of the operations of the law of heredity. Here, as in the arboretum, we are taught that though nurture may do much, nature does most.

The cottonwood can never become an oak, but it can pass the oak in the race for maturity. It can even aid the oak to become more stately in form, to grow straighter

and taller than when left to itself, without the competition of more swiftly shooting trees. A row of acorns planted between two lines of infant cottonwoods will come up and make an effort to reach sunlight, up beyond the shadows of their soft-wood competitors, which oaks never make when planted by themselves. Thus in the arboretum the less is made to act as a nurse and guardian to the more valuable timber. At Arbor Lodge some years since, in 1865, I planted a long row of black walnuts between two ranks of swiftly growing soft-wood trees—maple on one side and cottonwood on the other. During these twenty years I have watched the walnuts growing symmetrically and beautifully to great height, in their struggle to reach the light up and beyond the shade of their less valuable contemporaries and co-tenants. They are higher, better trees than they would have been without the rivalry of their neighbors—their classmates.

So mind by contact with mind and struggle of brain with brain is improved. The mediocrity of one is almost obliterated by contests with the superiority of another. Just as trees seek—must have—sunlight, just as they reach up into the sky for it out from shade, so the mind in competitive seeking after knowledge ever exalts itself, perfects and embellishes itself. A dull brain developing in solitude is dwarfed and gnarled like a lone oak on the prairie; but associated with the sharp, quick perceptions of its superiors, it becomes a better brain, and bestows benefits upon mankind where in solitude it would have withered into fruitlessness. The wonderful similitudes between tree life and human life are almost innumerable. They have been recognized in all ages, and man's metaphors for all that is beautiful, useful, desirable, and immortal have been, since written language began, largely drawn from sylvan life. The "Tree of Knowledge," the "Tree of Liberty," the "Tree of Everlasting Life" have been planted in all poesy; they have bloomed in all literature from the remotest of historic times. Books not drawing simile, metaphor, or other figure of speech from tree life have been rare indeed. But the most beautiful tree, with its sheltering arms and its many-voiced foliage singing in the breeze, dancing in the sunbeams, and motioning to its own reflections on the greensward mirror below, with all its lustrous burden of fruit or flowers shimmering in the light, has a lower life invisible to us. Deep in the dark, damp earth its rootlets are groveling for existence—seeking here and there all manner of rottenness and feeding thereon with gluttonous avidity. Up in the clouds, gilded with sunshine, resplendent with coloring, nods the stately head; but down in the darkness and dirt are its supporters.

And as trees thus lead a dual life, an upper and a lower, so does man. The intellect, the reason, bathes in the light of knowledge. It scales the height of the firmament and reads the story of the stars. It descends into the profoundest depths of the sea and wrenches the secrets of creation from the rocks and shoals. Beautiful, symmetrical, flashing, and entrancing as a grand oak in autumn when crowned with gorgeous gold and crimson and purple leaves is the sturdy mind of a mature man, who, in temperance and tranquillity, has during a useful life grown strong in knowle'ge, in truth, fidelity, and honor.

Man's intellectual life must dominate. His lower life must be subservient. His mentality, like the tree top with its foliage, flowers, and luscious fruit, alone bestows the blessings. That is man's higher life, and where it governs, man is man as nature meant man to be. The small trees of to-day's planting will develop into the groves and forests of the future. They will contribute the materials for ships, railroads, business edifices, and homes, to be used by those who are born in coming centuries.

The almost infinite possibilities of a tree germ came to my mind last summer when, traveling in a railway carriage amid the beautifully cultivated fields of Belgium, a cotton wood seed on its wings of down drifted into my compartment. It came like a materialized whisper from home. Catching it in my hand I forgot the present and wandered into the past to a floating mote like that, which had years and years before been planted by the winds and currents on the banks of the Missouri. That mote had taken life and root and growing to splendid proportions until in 1854 the

ax of the pioneers had vanquished it, and the saw, seizing it with relentless, whirling teeth, had reduced it to lumber. From its treehood evolved a human habitation, a home—my home—wherein a mother's love had blossomed and fruited with a sweetness surpassing the loveliness of the rose and the honeysuckle. Thus from that former feathery floater in mid-air grew a home and all the endearing contentment and infinite satisfaction which that blessed Anglo-Saxon word conveys—that one word which means all that is worth living for and for which alone all good men and women are living.

Here are a few acorns to-day; to-morrow, a century hence, they are sturdy oaks, then ships, railroads, carriages, and everything useful, and parts of homes which are all—in both poetry and reality—that is lovable, beautiful, and supremely tender in the career of humanity from birth to death. The real of to-day was the ideal of yesterday; the ideal of to-day will be the real of to-morrow.

And as arboretums are developing the infant forests, nursing tremendous timbers, whence masts and spars and sills and joists shall emerge into swiftly sailing ships

and massive marts of trade, which are to convey and cover the commerce of coming times, so in the schools, the colleges, and universities are growing the mental timber whence the State shall cull in the near future those pillars and supports which aid to bear up forever in America civil and religious liberty; that is, freedom to think, freedom to speak, freedom to trade, freedom to develop individualism, and to assert its consciousness of right without fear either of sectarian or partisan bigotry. Let us all, then, each in his vocation and sphere, plant wisely for the years to come, rather than dwell dejectedly upon the years gone and going—the farmer, his forest and orchard, the teacher his science and morals. Improved materially by the former, intellectually by the latter, the world will well with gratitude to both. But tree planter and teacher united in one shall be declared the best benefactor of modern times—the chief provider for posterity.

On the 10th day of July, 1886, from the crowded, hurrying streets of London I loitered into the solemn aisles of St. Paul's Cathedral. Around on every side were the statues of England's heroes. Upon tablets of brass and marble were inscribed their eulogiums. In fierce warfare on wave and field they had exalted English

courage and won renown for England's arms. Nelson and Wellington, victors by sea and land, were there, and hundreds more whose epitaphs were written in blood which, as it poured from ghastly wounds, had borne other mortals to the unknown world. Few men who won distinction in civil life are entombed at St. Paul's, but among them is the gifted architect, Sir Christopher Wren, in whose brain the concept of St. Paul's Cathedral had a mental existence before it materialized in massive marble. His epitaph is plain, brief, truthful, impressive; it is one which each honorable man in all the world may humbly strive for and become the better for the striving; it is one which every faithful disciple of horticulture, of forestry, will deserve from his friends, his family, and his country; vast orchards which he has planted and the great arms of towering elms, spreading their soothing shade like a benediction over the weary wayfarer who rests at their feet, and all the fluttering foliage whispering to the wanton winds shall tell the story of his benefaction to humanity, arborphoning that epitaph with perennial fidelity, "Si quæris monumentum, circumspice"—If you seek my monument, look around you.

Appropriately following the address of Mr. Morton, some extracts from an address of the Hon. B. G. Northrop, on Arbor Day, before the Massachusetts Horticultural Society, have place here:

OBSERVANCE OF ARBOR DAY BY SCHOOLS.

In this grand work initiated by Governor Morton [J. Sterling Morton], its application to schools was not named. The great problem then was to meet the urgent needs of vast treeless prairies. At the meeting of the American Forestry Association, held at St. Paul, Minn., in August, 1883, a resolution which I offered in favor of observing Arbor Day in schools in all our States and in the provinces of the Dominion of Canada (the association being international) was adopted, and a committee to push that work was appointed. Continued as their chairman from that day to this, I have presented the claims of Arbor Day personally or by letter to the governor or State school superintendent in all our States and Territories. My first efforts were not encouraging. By men in high positions Arbor Day was deemed an obtrusive innovation. It was no surprise to me when my paper on "Arbor Day in Schools," read at the National Educational Association (department of superintendence) at Washington, in February, 1884, called out the comment, "This subject is out of place here." Though that paper was printed by the United States Bureau of Education, it was a grateful surprise that the next meeting of the National Educational Association, held in August of the same year, at Madison, Wis., with an unprecedentedly large attendance, unanimously adopted my resolution in favor of Arbor Day in schools in all our States.

The logic of events has answered objections. Wherever it has been fairly tried, it has stood the test of experience. Now such a day is observed in forty States and Territories in accordance with legislative act, or by special recommendation of the governor or State school superintendent, or the State grange, or the State horticultural and agricultural societies, and in some States, as in Connecticut, by all these combined. It has already become the most interesting, widely observed, and useful of school holidays.

Arbor Day has fostered love of country. Now that the national flag with its forty-four stars floats over all the schoolhouses in so many States, patriotism is effectively combined with the Arbor Day addresses, recitations, and songs. Among the latter, the "Star Spangled Banner" and "America" usually find a place. Who can estimate the educating influence already exerted upon the myriads of youth who have participated in these exercises?

To the teaching of forestry in schools, it is objected that the course of study is already overcrowded—and this is true. But I have long urged that trees and tree life and culture form a fit subject for the oral lessons now common in all our best

schools. When agent of the board of education of Massachusetts I sometimes took to the schools and institutes a collection of our common woods, as an object lesson, one of many aids in observation, discriminating wood by the grain. The same plan was occasionally tried in Connecticut, and with good results. To give one of many illustrations: A citizen of Norfolk, Conn., offered eighteen volumes of Appleton's Science Primers to any pupil who should gather and arrange the largest and best collection of the different kinds of wood, shrub, or vine growing in that town. Great interest was awakened, and 135 varieties were gathered by all the competitors, of which the collection of Washington Beach (who won the prize) numbered 125. What a discipline in quickness and accuracy of perception those schoolboys gained while exploring the fields, hills, and mountains of this large town, and discriminating all these varieties by the grain or bark! With no interruption of studies, there was a quickened zest and vigor for school work, and, best of all, that rare and priceless attainment, a trained eye. * * *

Those talks on trees, which Superintendent Peaslee says "were the most profitable lessons the pupils of Cincinnati ever had in a single day," occupied only the morning of Arbor Day, the afternoon being given to the practical work. Since 1883 our schools have rendered new service to the State as well as to their pupils by leading them to study the habits of trees, and appreciate their value and beauty—thus tending to make practical horticulturists and arborists. How many of these children in maturer years will learn from happy experience that trees, like grateful children, bring rich filial returns, and compensate a thousand fold for all the care they cost. George William Curtis says, "Arbor Day will make the country visibly more beautiful year by year. Every school district will contribute to the good work. The schoolhouse will gradually become an ornament of the village and the children will be put in the way of living upon more friendly and intelligent terms with the bountiful nature which is so friendly to us."

Kindred in sentiment with the address of Secretary Morton and the remarks of Dr. Northrop are the following words of Dr. E. E. Higbee, the late distinguished State superintendent of public instruction of Pennsylvania:

ARBOR DAY FOR THE COMMONWEALTH.

Recognizing the peculiar fitness of the executive proclamation fixing an Arbor Day for the Commonwealth, it has been our effort and pleasure to make it in every way as efficient for good as possible in relation to our public schools. Here, among the children, habits of thought and feeling in regard to the benefits and uses of tree planting can be formed, which will deter them, it is hoped, from that destructive greed which has forgotten the value and beauty of green woodlands and parks, and the glory of shadowy hills and leaf-hidden streams where the trout snaps the unwary fly and the liverworts peep out from the dewy moss and wake-robins nod their heads to the answering ferns. Children need, in their innocent up-springing, to have room to get away from the garish sun and rest, as upon a mother's bosom, in the twilight silence of the growing woods. We have endeavored to keep in view, so far as possible, the educational power of such things by urging that our school grounds be supplied with shade trees and shrubs and flowers, and that the naked walls of our school buildings be trellised over with vines. Children feel most deeply the ministry of that which charms the eye.

> We are what sun and winds and water make us;
> The mountains are our sponsors, and the rills
> Fashion and win their nursling with their smiles.

Unconsciously each impression of such character sinks into the tender depths of their souls and there it remains as in reflection do the willows in the placid stream. In fact, the scenes of nature are perennial companions, growing more friendly from

year to year. Those most familiar, wherever we may be, are ever entering the study of our imagination and often giving direction even to our acts. "The shepherd," as with exquisite pathos has been said by Wordsworth, "is half a shepherd on the stormy sea, and hears in piping shrouds the tones of waterfalls and inland sounds of caves and trees; and in the bosom of the deep sees mountains, sees the forms of sheep that grazed on verdant hills."

Arbor Day, repeated in our schools from year to year, will cultivate a reverent love of nature, will lead our children to value studious walks along our streams and hills and through our winding valleys and wide, windy sweeps of harvest fields and meadows, and into our bosky dells to waken courteous Echo to give them answer from her mossy couch.

There is, indeed, a power and a culturing beauty in all this which every child may experience if he will; and Arbor Day serves to enforce it upon his thought. Why should not our school children cherish a holiday which brings them into direct sympathy with the sweet companionship of man with nature? Why should they not offer their aid in giving to our school-grounds green lawns over which the wind-stirred trees may scatter gold and porphyry—where the laughing daffodils may welcome the returning swallows, and glowing clusters of chrysanthemums may soften the cold of autumn winds with thoughts of summer? Why should they not surround their school home, which they must so soon leave for the harsh toil of business life, with all that can make the memory of it a joy forever?

VALUE AND USES OF ARBOR DAY

A very just tribute to the value and uses of Arbor Day will be found in the address of Prof. George Mull, of Franklin and Marshall College, in connection with the observance of the day at the High School, Lancaster, Pa.:

Arbor Day is no longer a novelty, confined here and there to isolated districts, and attracting attention in the minds of few as a conspicuous evidence of an enlightened public sentiment in a few favored localities. A good thing is always sure to make its way, and it can not be said that this particular good thing which claims our consideration to-day was slow in making its way into the heart of public-school life throughout the length and breadth of our country. Scarcely heard of, barely thought of, a few years ago, it was possible to make the statement, at the American Forestry Congress, last December, that Arbor Day is now kept in nearly every State of the Union and in some of the Territories, and, indeed, in one State, South Carolina, a whole week is now devoted annually to tree planting. Such a rapid and widespread adoption of the custom is a sufficient indication of the merits of its claim to popular favor. It is hardly time yet to count the cost and estimate the results, but from what has already been done there can be no doubt that the practical benefits accruing to the material well-being of the country from the faithful observance of the

day, will, in the near future, by the incontestable proof of what the eye may behold, establish the wisdom of those who have the honor to be numbered among the founders of this most excellent institution. With reference to this phase of the subject—the bearing it has upon the material prosperity of the country—there can be no difference of opinion. Everyone who is familiar with the statistics showing the rapid destruction of our forests will readily agree that there is urgent need that the public attention should be directed to tree planting, and there is no other medium through which this can be so effectually accomplished as through the public schools. It was wisely ordered, therefore, that the public schools should be enlisted in the work of conserving the material prosperity of the State in this important respect.

But while there can be no doubt that Arbor Day owes its institution primarily to economic considerations, and that upon this ground it met with so swift a response of popular recognition and interest, it is equally certain that the founders of the day builded better than they knew. For the broad and beneficent results flowing from this movement are not to be estimated in their sum total by the impressive array of cold figures in statistical tables—not even though they reach the enormous proportions of "605,000,000 trees planted in the single State of Nebraska, and now thriving there, where a few years ago none could be seen except along the streams; and this used to be called 'The Great American Desert,' where seventeen years ago the geographies said trees would not grow—and now the leading State of America for tree planting."

But this, though it be a matter for congratulation and rejoicing, conveys but a faint idea of the importance of the day as touching the very springs of our social life by its intimate connection with the public schools of the Commonwealth. More than this, if merely utilitarian or purely commercial considerations are to dominate our reflections upon this day, then we have no hesitation in saying that the day had better not been instituted. For in the midst of the intense activity of the present age, when all around us we see the plainly marked tracks of that myriad-shaped spirit of the times, whose tendency is ever toward the practical and material side of life, and which can see little or no good in anything that has not its immediate fruitage in palpable results to be measured by the yardstick, weighed in scales, and counted up in bank books; when, in the significant language of a thoughtful public school man, "knowledge is no longer regarded as the wings wherewith we fly to Heaven, but the claws with which we burrow into the earth in search of its glittering treasures;" when, in a word, we are confronted on all sides by forces that irresistibly impel us foward in the lines of practical pursuit with a natural leaning toward selfishness and greed; under these circumstances, surely, there would seem to be no need to give impetus to a stream that has such a strong current of its own by making a special effort to set before the children of the Commonwealth the observance of this day, as an object lesson in tree planting, upon grounds of thrift and public economy alone

Happily there is another phase of the question which makes the celebration of Arbor Day altogether commendable. I refer to the educational value it possesses, which, indeed, is not to be estimated by the stores of useful knowledge clustering around it and finding through this channel an easy way into the mental equipment of the scholars. The wise teacher, to be sure, will not fail to utilize the occasion as one of the best means placed at his disposal for the purpose of imparting practical instruction in the department of botanical science. The significance of this feature is not to be underestimated. It is of unquestionable importance, but there is still a higher importance attaching to the celebration of the day, viz, the cultivation of a feeling for nature, by bringing us into touch and sympathy with the wondrous works of the Great Creator as revealed in the manifold forms of beauty—the endless variety of his handiwork throughout the vegetable kingdom. We are so wrapped up in our daily pursuits, so immersed in the things of flesh and sense that are of necessity involved in the unceasing struggle for existence and for a comfortable living, that the deeper spiritual forces of our being are in constant danger of

being suppressed. We need something to draw us away from the hardening conditions of a life centered in self and absorbed in the purely material aspect of things. Especially do we need something to create and stimulate in the hearts of our children a genuine love for the works of nature. This can not be done by the text-book study of botany—no more than the treasures of literature can be appropriated and made a heart possession by the study of grammar. It can not be done by studying nature solely in the interest of scientific truth.

To this, one of the world's greatest students of nature, Charles Darwin, has borne conclusive testimony. Indeed, it is inexpressibly sad to hear him in his later years, when the "frontlet of olive culled far and wide" was vying with the "ivy leaf, the meed of learned brows" to grace the chaplet of his enduring fame, declare in the undertones of lamentation that he could not endure to read a line of poetry, that Shakespeare was so intolerably dull as to nauseate him, that he had almost lost his taste for pictures and music, that fine scenery failed to cause him the exquisite delight it formerly did, and that his mind seemed to have become a kind of machine for grinding general laws out of large collections of facts, resulting in the atrophy of that part of the brain on which the higher tastes depend. "The loss of these tastes," mark his words, "is a loss of happiness, and may possibly be injurious to the intellect, and more probably to the moral character, by enfeebling the emotional part of our nature."

Let us take the lesson to heart. It needs to be heeded, for, in the strenuous efforts that are now being put forth, with the best of motives, to make our education more and more practical, the importance of cultivating the æsthetic and moral faculties is only too apt to be overshadowed. It is possible to become too practical. "Ruskin speaks of men so 'practical' that they would turn the human race into vegetables, make the earth a stable, and its fruit fodder. There are vine dressers and husbandmen," he says, "who love the corn they grind and the grapes they crush better than the gardens of the angels upon the slopes of Eden; hewers of wood and drawers of water, who think that the wood they hew and the water they draw are better than the pine forests that cover the mountains like the shadow of God, and the great rivers that move like his eternity." For all such, nature speaks in no intelligible voice, Milton's grand epic has no meaning because it "proves nothing," the healthy and elevating tone of the writings of a Wood and a Jefferies touches no responsive chord, and these loving interpreters of nature have their books rated "heavy" by the trade. "We observe the face of nature so little, that the few enthusiasts who have come to know her speak to us, when they would describe her beauties, in an unknown tongue."

The planting of a tree, the tender care bestowed upon it, the eager watching for new developments in its growth, the tending of a flower bed, the training of a vine, will for many a child prove the "open sesame" into the charmed circle of those forces and factors of the natural world which purify, refine, and ennoble the heart of man. The process itself can not be indicated. It is secret, silent, past finding out. It is a growth—that subtle something, which is forever escaping the clutch of the keenest investigator, only to find easy access to the soul of him who hath eyes to see and ears to hear what is revealed of the Infinite in the finite order of creation.

> Powers there are
> That touch each other to the quick—in modes
> Which the gross world no sense hath to perceive,
> No soul to dream of.
>
> —[Wordsworth.

Though we may not analyze these mysterious powers which touch us at every point of our natural environment, quickening our impulses, warming our affections, exalting our thoughts, purifying our tastes, enlightening our whole being, we know enough of them to prize them at their full value. Nor is this beyond the range of the practical. For what is more truly, more wisely practical, than to set in operation

forces and influences that will contribute to the personal happiness and comfort of the individual? What more practical, than to introduce into our homes an appreciative sense of the beautiful, the healthful, the useful in nature? It is but a step from the school to the home, and it is clearly the part of practical wisdom to make that step as fraught with beneficent results as it is possible to effect in the school.

A right feeling for nature means infinitely more than the planting of trees. By a necessary law of association, it embraces a wide range of conditions in our every-day life. It means a greater exhibition of tenderness, thoughtfulness, and gentleness in our social intercourse; it means a greater regard for orderliness, neatness, and beauty in our surroundings. A tree planted needs attention and care, which can not be bestowed without entering into the general habit of the planter; it may need a box to protect it; the shrub or bed of flowers suggests the well-kept lawn or the more modest grassplat; and these in turn point to a neat fence, a clean yard with trim walks, a painted house, and within, tidy rooms, decorated walls, pictures and books, good cheer and comfort. It will be readily admitted that these things can not be, without affecting wholesomely and only for good the moral tone of the family life, and, through it, that of the community.

PLANTING TREES A PATRIOTIC DUTY.

Not less interesting and pertinent is the address of Dr. J. T. Rothrock, State commissioner of forestry of Pennsylvania, to the public schools of Lancaster on Arbor Day of last year:

Less than three centuries ago, in the providence of God, our ancestors fell heirs to a land which was not only well watered and fertile, but well wooded. It is fair to say that on the eastern slope of the continent there was no second area equal in size to Pennsylvania which possessed resources so varied and that bid fair to last so long. So rich was our inheritance that we felt we could never come to want or see the end of our resources. American extravagance has become a byword among other nations, and Pennsylvania is in no respect behind others in the sisterhood of States.

But already practically 75 per cent of our State is destitute of real forest growth, and to meet the wants of a rapidly increasing population we are now importing lumber. Not only this, but from about an eighth of the land which we have cleared we have so exhausted the fertility that it can no longer be made remunerative in agriculture. In at least one county of our State we have the word of the president judge that the barren hillsides are being deserted by their population because they can no longer wring a living from the impoverished lands.

Thus far mankind has derived its food from the soil or the water. In the state-house of Massachusetts there hangs a figure of a codfish, to indicate that from the sea that great Commonwealth derives a large part of its support. Our waters are practically barren, and our strength must come from the soil. I desire now to leave a question with the young people of Lancaster. It is this: If on the one hand we double our population in about thirty years, and if, on the other hand, we continue to make so much of soil poorer every year, how will those who come after us obtain a living? Bear in mind that when you render the soil incapable of producing a crop you cut off the head of the State. Thirty years and more ago our nation's life was in danger. From the hillsides of Pennsylvania more than two hundred thousand brave men poured down to save the country, that your lives might be peaceful, happy, and prosperous. I know you love the dear old flag around which so many of us rallied. I know that there is not a boy or girl before me but thinks the red, white, and blue of "Old Glory" are the very brightest and best colors that fly in the breeze of any land. Its ample folds mark the thousands of schoolhouses where you are taught to become good men and women and patriotic citizens. But you are now called upon to save the State from wasting its strength, and from becoming weak and poor, when it should be strong and rich. God never allowed a child to grow up

to be a citizen without providing something for him or her to do for the public good. Every citizen should in some way aid in making every acre of the State as productive as it can be made. Of all things, a useless soul and a useless acre are the most useless. I call upon you young people here, who are thinking already what you will do when you grow up, to resolve that you will be patriots, and help make the land in which you live as near a paradise as you can. You will be wiser if you begin at once to do some good thing. Here is a chance. Every tree that is planted helps to save water for the uses of the people. It helps to restrain the floods which destroy life and property. It helps to keep the air in pure condition for you and your associates. It helps to moderate the climate so that crops may grow and fruits mature.

If, then, you plant a tree, you increase the wealth and strength of the Commonwealth, and at the same time you aid in husbanding its resources. Is not this a worthy work? But it is so small a thing, you may say! True, but life is made up of small things. How many really great things can anyone do? The great acts of any man's life are few. It is the multitude of small deeds which makes life important.

Nebraska was once almost a treeless area. Now it is a well-wooded State. This is almost entirely due to the Arbor Day planting which Secretary Morton started a score of years ago. His example has spread from State to State, until over almost the entire Union a day is set apart every year for the purpose of tree planting. European countries are taking up with the idea. It has spread to the isles of the ocean. If we except Christmas and Easter, there is probably no anniversary more widely celebrated than Arbor Day. Of course the date must vary with the country. In our Southern States, February 22, the birthday of Washington, is often selected as Arbor Day.

I desire especially to call attention here to a mistake too often made in connection with Arbor Day: This is the planting of foreign instead of native trees. It is now well known that no foreign species except possibly the Eastern plane tree is so long-lived as the corresponding native species. As between foreign and native trees, then, give the first place to our own species. In the country, as in smaller towns, nothing is better than our white oak, a native elm, or a sugar maple. Do not plant the silver maple. It is too weak to support its own enormous growth. It must be cut back. This opens the way for decay, and just when your tree should be in its prime it is in the stage of decay.

Reforms mature slowly. See with what infinite persecution the emancipation problem was worked out! Before our land became in deed and in truth "the land of the free," every hamlet received its baptism of blood and every citizen felt the drain upon his finances.

The great temperance reform has grown from contempt into respectability, and before you young people are in the prime of life you will see under restraint the monster of intemperance, which brings untold agony into thousands of homes. So it is with the forestry problem. We are now passing from the period of destruction to the period of restoration. Hardly a State in the Union but is concerning itself with this great reform. Pennsylvania has earned a first place as a pioneer in the movement. In my travels over the country I see on all sides the signs that a reformation is at hand. When I was a lad I never saw or heard of planting a tree in a school yard. Now, in the remotest parts of the State, I see growing in school yards the trees under whose ample branches the children of the next generation will play.

I look on the hopeful side of things. The world has constantly been, in the main, becoming better fitted for the prosperity and comfort of men. It is the natural order of evolution. It is not too late to restore our forests on land where nothing but trees will grow. It is not too late to make our roadsides, our school yards, our swamp land, and our barren ridges eloquent witnesses of God's willingness to help us beautify our living places, and perpetuate the prosperity of our Commonwealth. You may never command armies, or thrill a listening nation by your eloquence; but you may at least, each one of you, leave a thrifty, growing tree, or more than one,

to show those who follow that you were unselfish enough to labor for the benefit of posterity that you may never see. You may at least exemplify the noble justice of leaving the world in as good condition for the prosperity of your children as you found it for yourselves. All this you may do by simply planting a tree, which will grow while you sleep and draw its strength and its long life and large usefulness from the sunshine and the storm, costing nothing, "harming no one, blessing everyone, and pleasing God." Will you do it?

Suppose each child in the State of Pennsylvania between the ages of 5 and 17 years plants a tree which grows to a mature size. Put these all together at 15 feet apart, and you will have a forest of 11½ square miles. That means 7,360 acres of forest—good, productive forest. Each acre of such forest can, in the growing season, give back to the air about 14,500 tons of water by evaporation or transpiration. In other words, as the result of planting one tree for each school child of to-day there might be distilled back into our air, from this eleven and more square miles of forest area each growing season, 106,720,000 tons of water.

Now I want to ask you if you know what that water does up in the sky. It destroys the frost which kills your crops. That is, each one of you here who plants a long-lived tree of a kind that may grow to large proportions, will, when it has grown to middle size, be placing away up there in the sky over seventy tons of water each year, which is to help protect and produce the grain on which your grandchildren will live. Indeed, it may be, you will find when you are done with earth that you have placed something in the sky of more importance still. You know that to "love your neighbor" is half of the Divine command. Will you plant a tree somewhere this year?

SCHOOLS OF AGRICULTURE AND HORTICULTURE.

The relation of Arbor Day to agriculture and horticulture is well set forth by Hon. Charles R. Skinner, State superintendent of schools, New York:

There is a practical as well as a sentimental side to Arbor Day. It had its inception in a commendable movement looking to the protection of our forest trees, and what may be called the making of new forests on the vast plains of the West. The sentimental feature attached to its observance has been in the development of a love for Nature and her wonderful works, and in the encouragement to delightful study of trees, plants, flowers, and birds. There is no doubt that in hundreds of thousands of the children of our country there has been awakened a deep interest in the attractive study of how plants grow, of the use and abuse of trees, and of the relations which birds and flowers bear to the problem of Nature and to human happiness. A child who learns to love trees and flowers and who derives happiness from them can never go entirely wrong. The whole subject tends to a closer study of Nature in all who have a love for growing things. This study of Nature can be turned to practical use, and be made of lasting benefit to many thousands of the world's workers, especially to those whose privilege it is to till the soil—and from the farms to feed the world. There is a lack of knowledge of the scientific principles of agriculture. This lack increases manual labor without increasing results or happiness. How to

make farming pleasant and profitable, how to increase its attractions, how to keep the boys on the farm are some of the problems of our times. There are mysteries of Nature which a well-educated agriculturist can solve with profit and pleasure. Ten acres scientifically tended can be made as profitable with less labor as one hundred acres carelessly cultivated. The brain should relieve the hand. Education should abolish drudgery. There is profit as well as poetry in "a little farm well tilled."

Then let us make a place in our educational system for schools of agriculture and horticulture. Our agricultural colleges have their places in the system, but they

are beyond the reach and above the heads of a great majority of the boys who are to be the farmers of the future. While our common schools are laying the foundations of an all-around education, let us give our children practical lessons which will help on the farm. We may not teach all our boys to be farmers, but we may give those who go from the schools back to the farms a knowledge which shall arouse a love and an enthusiasm for agricultural pursuits which they could never otherwise obtain. This love would do more than any other influence to keep our boys on the farms. It is the child who shows most enthusiasm in study and in play. Then let us teach our children the simple lessons in botany, chemistry, geology, and

zoology, with which they may combine the study of the habits of plants and trees, how they grow and develop; the study of birds, which are the friends and not the enemies of mankind; the study of the composition of soils, the chemistry of fertilizers, the needs of grasses and grains, and the harm of noxious weeds. Let them learn that what is taken from the ground must be paid back; that there is a reciprocal relation between the soil and the fertilizer, as between the giver and receiver. How to graft, how to plant and transplant, how to save and how to prune, how to sow and how to reap, are among the things which should be taught. Give us courses in the common schools for the boys and girls who want them, which shall teach some of the pleasant things connected with farming. Teach also that it costs no more to produce a pound of good butter or cheese than a poor one. Give us a garden by the schoolhouse where the lessons of Arbor Day can be practically illustrated, where children can plant and water, where they can see things grow, see nature develop, see life in soil and plants. France is doing much in this direction, and Canada is agitating the question. Arbor Day should give us educated farmers.

ENCOURAGING WORDS FOR ARBOR DAY.

Beneficent influence of Arbor Day.—It must be borne in mind that Arbor Day is not a holiday, but simply a particular day set apart for special instruction in all that pertains to the most useful and beautiful of the kingdoms. It would not be amiss if a day were given to each of the other kingdoms, the animal and the mineral, for the same purpose. That Arbor Day has been of incalculable value, æsthetically and ethically, is no longer doubted; and, with this generation, trees around a schoolhouse are not looked upon as a source of supply for convenient instruments to maintain discipline, as they probably were a decade or two ago. The vandalism that begins with cutting and marring the school desks and destroying school shrubbery has disappeared, which is one of the innumerable arguments in favor of its beneficent influence upon the malicious passions of the young.

The lessons learned about trees, plants, and flowers since the institution of Arbor Day has caused us to observe more closely and to love more ardently these gifts of nature. Our greatest poets and statesmen have written reverently of these treasures, and spoken with sublime veneration and patriotic fervor about those of a historic reputation. The literature associated with this kingdom excels all others in purity and devoutness, and millions of the present school generation will recall these days as the one green, glowing oasis in a long life. Henry Thoreau said: "The intellect of most men is barren. It is the movings of the soul with nature that makes the intellect fruitful, that gives birth to imagination."—John Terhune, superintendent, Bergen County, N. J.

Not merely a day for tree planting.—When this day was first appointed I felt that it was not intended for us. We did not need it. Trees were abundant on our streets and around our houses. But since we have kept it, as we have for the past two years, I have had my eyes opened to its importance. We may have trees in abundance, but there is a lesson to be taught on this day that can not be put too strongly before our children. It is a day when we should strive through general exercises, and by plain talks from the teachers, committeemen, and others who may be induced to address the children, to impress upon them a love of the beautiful. Remember

that our schools are expected to elevate, to make better citizens, and not simply to cram the pupils' heads full of a certain amount of knowledge, in order that they may be able to make money a little easier when they grow up. We should teach them to do all in their power to beautify their homes; also aid them in adorning their schoolrooms. Let these two places be made most attractive and the work of the schoolroom will be wonderfully advanced.

The saloon perceives the importance of this idea; witness the magnificence of some of the city saloons. Let us counteract this by doing what we can to induce the child to make his home the most attractive place in the world.

A little ingenuity will work wonders. The home of the poor is often far pleasanter than the mansion; so it does not all depend on the amount of money expended.

The same effort should be made to make the schoolroom attractive. To the effect of this I called your attention several years ago when the ungraded school was removed from the room in the old brick schoolhouse to the pleasant quarters in the Byfield building. What had been an unruly school, and one that every child dreaded to attend, became instantly a model school and one that was very popular. This is a practical illustration that we should remember. We may say that it is all nonsense; that it makes no difference what kind of a room is used for a school. Here we see most conclusively that it does.—J. P. Reynolds.

Beneficial results of Arbor Day.—Arbor Day was observed this year in all the schools according to the programme prepared by the commissioner of public schools. At nearly all the schools a tree, or vine, or shrub was planted on or near the school grounds. The encouragement of this custom will give to each class a permanent possession in the school grounds, increase their interest in the school in time to come, and be a promoter of pleasant memories of school life.

The presence of trees on or near the school grounds will attract the birds, and these by their presence will aid the teachers in inculcating the principles and practices of the Society for the Prevention of Cruelty to Animals. In one school this year attention and interest have been concentrated upon a pair of robins which built their nest in a tree in the yard and in sight from the upper windows of the schoolhouse.—W. A. Briggs, superintendent.

Indirect value.—The indirect value of Arbor Day and the opportunity it affords for moral instruction are appreciated by the teachers, whose first thought is apt to be one of regret for any interruption of regular work.—T. O. Draper, superintendent.

A beautiful custom.—Another custom which we urge all of our schools to adopt is the careful observance of, and participation in, the exercises of Arbor Day, a custom beautiful, simple, useful.—F. B. Gifford, clerk.

Gaining attention.—The subject of Arbor Day is gaining the attention of the teachers and pupils more than formerly, and it is to be hoped it will continue. If properly carried out it will cause the schoolhouse grounds to become more attractive to the children. It does seem as if the grounds around the schoolhouses of our country, where congregate some thirteen millions of pupils, should receive as much attention as the grounds around the homes, for nothing can exert more influence in creating a love for the beautiful in the minds of the rising generation.—C. J. Greene, superintendent.

Not a mere holiday.—Trees everywhere exert a controlling moral influence. They make home pleasanter, as we know and feel in our everyday existence. When a boy leaves the home of his childhood his heart, in whatever land it beats, shall, like the "seashell far from its ocean bed, retain some faint whisper of its early dwelling place." In after years the sight of home and school grounds, beautified and improved, will afford gladness and pleasure as season follows season.—D. R. Adams, superintendent.

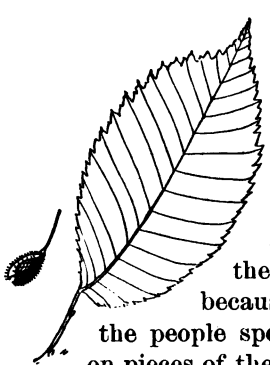
Practical use of the day.—Arbor Day and the preparation for it served to inculcate love for the whole realm of the vegetable world and much knowledge of tree and plant life. The schools also, after appropriate and interesting exercises in their respective rooms, came together at the Massasoit spring on Baker street, and planted a tree in memory of Massasoit. It might be well another year for the schools each to plant a tree on some treeless street.—A. E. Carpenter, superintendent.

Among our monumental institutions.—One of the pleasing evidences of improvement in society and the cultivation of a higher public taste is found in the establishment of Arbor Day. This interesting anniversary has not only found a place among the monumental institutions of our country, but it has met with very general and cordial approbation and support. It has its place in the calendar of our colleges, and it becomes an educational agency to all the youth of the land by its relation to our common schools. It has the support of no small number of enthusiastic advocates who promote its observance and press its claims upon the public attention, and build up around it its own peculiar and interesting literature.

As the years go by and the trees now newly planted expand themselves outward and rear themselves upward toward the sky, displaying their grand and majestic proportions, so the traditions and stories that gather round them and the day that gave them their place and their importance grow to be a living romance, blooming with elevating sentiment and bearing the fruitage of cherished associations.

When from the youth and childhood of the present proceed the names that attain to greatness and to fame, till all lands are filled with their renown, then this anniversary will bring together assemblages at the plantings of to-day to tell over with endless interest the stories of early struggles and victories, and so inspire to noble ambitions and aims the generations that are to follow.—Rev. J. Young.

TREES AND SCHOOLS.



If any persons should be peculiarly interested in trees it would seem to be those who are at school and who are especially engaged in the use of books, for the word book is the same as the old English or Anglo-Saxon word *boc*, which means a beech tree. The German *buch*, book, is almost the same as *buche*, beech; and substantially similar words are found in the Danish, Icelandic, and Gothic languages, because before the invention of printing the books of the people speaking these languages were written commonly on pieces of the bark or wood of the beech trees.

Then those who are studying Latin know that the word *liber* means both bark and book, which points to a similar usage. And those who have entered upon the study of the Greek language have learned that *biblos*, which means book, also means the inner bark of the papyrus plant, because the old Egyptians used to write upon its smooth and white surface. From the name of this plant again comes directly and

easily our word paper, while to go back to *liber*, we have from that our word library, or a collection of books, and from *biblos* again our word Bible, or the book of books. And now our books are often literally made of the trees. Only instead of taking chips or blocks of the beech tree to write upon, as our ancestors did, we grind the trees up into pulp, and having spread it out into thin sheets, the printer then prints upon them lessons of geography or arithmetic or history, and lo, the beech tree and other trees also come into the school room to help us in our studies. Every time also that we turn the leaves in our books we are reminded of the trees, which have given us the word.

And then the word *academy* causes us to think of the trees, for it points us back to that celebrated school which Plato, the Greek philosopher, taught in the grove of Academus. It was a school among the trees. It was as he walked with his pupils under the branches of the trees that he taught those lessons of wisdom which have been the delight of scholars down to our own time.

Fitly, then, are the pupils in our schools invited to take part in the observance of Arbor Day, and if there is any spot peculiarly appropriate for the planting of trees on such an occasion it is that where children assemble for instruction, that thereby they may have around them the beauty and pleasantness which trees afford and every school place may become another "grove of Academe."

TREES AS LIVING THINGS.

All things in the world may be divided into two classes, things which have life and things which are without life. What life is we do not know. We know only its effects—what it does. We can neither see it nor feel it. We can not perceive it by any of our senses.

We recognize life most commonly as something which produces motion. So we say an animal is alive or has life, because we see it move. The stone is not alive; it has no motion. It does not change its shape or color. It looks to-day as it did years ago; it is no larger now than it was then. So of a piece of iron or any other metal. But the animal moves about; it changes its shape; it increases in size; it grows, as we say. From a small and very feeble thing it becomes large and strong. It is because it is a living thing or has life that it grows. The life in it has the power of laying hold of other things and building them up into the body of the animal, so that it enlarges until it has reached the size which

belongs to it. So the life or life principle in us builds up our bodies little by little, and day by day, from our infancy, until we are grown-up men and women.

Now, the trees are living things like ourselves, and this gives them special interest for us. Living things have what we call organs, or instruments by means of which the life or life principle acts and performs its work. So the trees have many such organs as we have, and thereby resemble us. They have organs by which they take in food, they have lungs by which they breathe, and they have organs of digestion and a circulatory apparatus, by which their food is prepared and carried to all parts of them and causes them to grow and reach their perfection.

The trees can not move about from place to place, as we and most animals do. They would not be what they were meant to be nor of such use to us as they now are if they could. But they are none the less alive although they remain in the same place all the time. There are some animals, such as the oyster, for example, which never move about. There are also some human beings who, by accident or otherwise, have been deprived of the power to walk or to move freely, who yet are as truly alive as any. There are many plants also that have a limited power of motion which shows a close resemblance to the animals in this respect, as well as in others which have been mentioned. There are what we call the climbing plants, which climb trees or walls just as truly as boys often do. Most plants love the light and sunshine, and these climbing plants seem to climb up for the purpose of getting out of the shade of other plants and securing to themselves the needed light. So they lay hold of any upright object near them, a stick or a tree, and winding around it or fastening their tendrils to it, climb up. Here there is motion all the time, and it can be seen very easily, especially when such a climber as the morning-glory fastens upon a short support. When it gets to the top of this it is not satisfied, but wants to go higher; so you may see it reaching out sideways and feeling around to find a new support, and it will sweep entirely around a circle, from right to left or from left to right, in order to find something to lay hold of by which it may rise still farther.

Then there are plants, like the Virginia creeper and the Japanese and English ivies, which climb walls or other objects by means of tendrils, which they stretch out like arms, and which sometimes have at their ends little disks like the suckers which boys make out of leather and with which they lift stones and other things. These disks are like so many hands, by means of which the plants climb up and hold themselves firmly where they can have the light which they need. If you try to detach one of these disks from the object to which it has fastened itself you will find it quite difficult to do so. The Venus's flytrap

(*Dionæa muscipula*) shows motion in a different way. It has at the end of its leaves an expansion like two leaves of a book ready to fold together, or like the shells of a clam. Around the margin of these leaves are bristles, with other more delicate ones in the center. When an insect alights on the open leaves and touches the central bristles, the leaves shut together so quickly that it is caught and held there till it dies. Other plants show motion in different ways. The trees also have motions independent of those which are occasioned by the wind or any external force. The locust tree and some others, for instance, fold up their leaves at night as though preparing to sleep, and spread them open again in the morning. Some move their leaves in a different manner. In all trees, also, there is in the roots a constant movement, at least during the growing season of the year. At the very beginning of its life the root as it sprouts from the seed insists upon going downward into the earth. Turn the sprouting acorn so that its root or radicle shall point upward and very soon it will turn and double upon itself, if necessary, in order to take a downward course, and though you turn it again and again, it will persist in its determination and die if necessary rather than give up the struggle. So when a tree is established and growing, though its stem must remain in the same place, its roots are all the while pushing out in various directions, winding around obstacles of one kind and another in pursuit of moisture and nourishment and making their way steadily on, so that nothing will so well describe the character of that part of the tree which is under ground as to say it is in a state of motion. Darwin, the eminent naturalist, goes so far as to claim that all the growing parts of plants, above as well as below ground, manifest voluntary motion, describing circles or circular spirals continually, "circumnutating," as he calls this movement. "If we look," he says, "for instance, at a great acacia tree, we may feel assured that every one of the innumerable growing shoots is constantly describing small ellipses, as is each petiole, subpetiole, and leaflet."[1]

The action of the life principle in the trees also often manifests astonishing force. Darwin found that the transverse growth of the radicle of a sprouting bean was able to displace a weight of 3 pounds 4 ounces in one case and one of 8 pounds 8 ounces in another. One can hardly walk where trees are growing among rocks without seeing instances of the splitting asunder of great masses of them by the growth of the tree roots which have gained entrance into their crevices when small, and in growing have expanded with irresistible force. So, also, it is a common thing to see the walls of buildings disturbed and much injured by the roots of trees growing near them. Experiments made by Professor Clark, at Amherst College, led him to think that the force exerted by a squash in growing was equal to about 5,000 pounds. Thus

[1] Power of Movement in Plants.

trees show that they are living things like us by having voluntary motion and exerting power.

Trees resemble us also as living things, and still more wonderfully, perhaps, in their choice of food. They can take food only when it is in a liquid or fluid state. They can not take any solid food, though the particles be ever so small. Nor do all trees make use of the same things for food. As they differ from one another in kind, so they require different kinds of food material in order to make them what they are. Or they require the various articles of food in different proportions one from another. They seem to have their preferences, their likes and dislikes about food, very much as we do. So, when different kinds of trees are growing together, each selects from the ground the food or the different kinds of food which will be most promotive of its growth. In this respect the trees do even better than we do, for they never take what is not good for them. The oak takes what will be best for it, and the maple what will build it up as a maple, and so of every other tree, and if the proper food does not happen to be where the tree is planted, though there may be other food in abundance, it will not become large and strong. There is hardly anything more wonderful than this instinct of trees by which they choose their food so unerringly, and the great effort which they seem to make sometimes in order to get the food they want. While they can not move from place to place, as as most animals can, because they are fixed to one spot, though some of the lower order of plants move about as freely as animals, they often send their roots long distances and over great obstacles in search of what will nourish them. Darwin, speaking of the motion of the root-tips of plants, says:

"It is hardly an exaggeration to say that the tip of the radicle, thus endowed and having the power of directing the movements of the adjoining parts, acts like the brain of one of the lower animals; the brain being seated within the anterior end of the body, receiving impressions from the sense organs, and directing the several movements."[1]

Such manifestations of life in the trees are very interesting. They are enough to make us feel that they are like us in many respects and to excite in us a sense of companionship with them, and we can hardly wonder that some people have imagined that living creatures dwelt in the trees and peopled the woods with nymphs, with dryads and hamadryads, or that in their superstition some have even worshipped trees. If we had more of that fancy of the old Greeks, that when a tree was wounded the nymph who dwelt in it was hurt or grieved, we should, perhaps, treat the trees around us with more care and have a tenderer feeling in respect to them.

[1] Power of Movement in Plants.

TREES IN MASSES—FORESTS.

Interesting as trees are, considered singly, admirable for their beauty, every leaf a worthy object of study, we do not know their value and importance until we contemplate them in masses, or as forests. The single tree on the lawn or by the roadside may be more beautiful and excite our admiration more than any to be found in the forest, because, having abundant space and light and air on every side, it has developed itself symmetrically and to the full perfection of its nature, which the tree in the forest, more or less crowded by its neighbors, can not do. But when we come to consider the usefulness rather than the beauty of trees, we must look to the forests, those great masses which often cover whole mountains or vast plains with their continuous stretches. Let us notice, therefore, some of the uses of masses of trees, or the importance which trees have when growing together in large numbers, and which does not belong to the tree when considered singly.

In the first place, then, it is from the forest that we obtain the fuel by which principally we warm our houses and sustain the fires in most of our furnaces and factories. It is from the forest that we obtain the timber for the construction of our houses, our ships, our railway cars, and the track upon which the cars are borne so smoothly and safely. It is the forests which supply us with the raw material that is wrought into so many objects of usefulness and convenience. Professor Sargent, who undertook ten years ago to ascertain the condition of the forests of the United States, estimated the yearly value of the lumber, fuel, and other forest products at that time as more than $700,000,000. Their value is now at least $1,060,000,000, a sum that exceeds the value of our crops of wheat, oats, rye, corn, and tobacco taken together, and is greater than that of all our exports, and more than fourteen times as great as the produce of our mines of silver and gold. It is estimated that we consumed last year, of sawn lumber alone, more than 36,000,000,000 square or superficial feet. But such figures by themselves are meaningless. Let us consider, then, that this amount of lumber would load a train of cars sufficient to encircle the earth at the equator. And now, if we add to the sawn lumber, which is only a small part of the total produce of the forests, the timber, the railroad ties, the telegraph poles, the posts for fences, and the wood cut for fuel

and for mining purposes, we shall have a train 100,000 miles in length, or long enough to reach four times around the globe. The weight of these forest products would be enough to load 480,000 ships of 1,000 tons each.

When we see thus what a vast amount of material of various kinds is taken from our forests every year, we have a most convincing proof of their value. We see at a glance how indispensable they are to our welfare, how many industries they must sustain, how many comforts and conveniences they must provide for all.

The importance of the forests and their usefulness to us may be shown, not only by such figures as we have just given, which indicate their total product, but in a contrasted way by considering some of what may be called the nuthought-of uses of the forest, because they are concerned with articles individually so small and insignificant.

A toothpick, for instance, is a little thing, the merest sliver of wood, yet it is reported that one factory uses 10,000 cords of wood annually in the production of these splints.

Shoe pegs are small affairs, yet a single factory sends 40,000 bushels of them to Europe yearly, besides what it disposes of at home.

A spool is of small account to us when emptied of the thread which has been wound upon it, yet there are several factories which use each from 1,800 to 3,500 cords of wood every year in making these little articles, and in one factory 150 men are said to be employed in their manufacture. Thousands of acres of birch trees have been bought at one time by some of our thread manufacturing companies, for the sole purpose of securing a supply of spools.

Who thinks much of the little friction match, as he uses it to light his lamp or his fire and then throws it away? But a single factory, it is said, makes 60,000,000 of these little things every day, using for this purpose 12,000 square feet of the best pine timber.

It will help us also to understand how much we are indebted to the forests when we find that we consume $12,000,000 worth of lumber every year for the packing-boxes alone which are required simply for the transportation of our various commodities from the producers to those who use them, and are then destroyed.

In what has been said now about the products of the forests and the benefits which they confer upon us, only a few out of many things have been mentioned. Nothing has been said of the gums and resins and spices which they afford, and which are of so much service to us. What a loss would it be to us, for instance, if we were to be deprived of india rubber and gutta-percha, or of the resin and turpentine of our pine trees, yielding us a product annually valued at $8,000,000. What could take their place? How many uses we have for them, uses many of which seem indispensable. How important to us also is the bark of many trees. We are dependent upon it for our leather. We can not put on a shoe or walk the streets without being reminded of our indebtedness to the trees. How many valuable dyestuffs, also, and how many healing medicines are obtained from the bark, as well as from the leaves

and other parts of the trees. From their seeds and nuts, also, what valuable products are derived. In some countries these supply a large part of the food of the people.

But the forests are of great importance to us not only on account of what they thus yield directly for our use and comfort, but on account of their relations to climate and health, to the flow of streams, and to the great interests of agriculture, commerce, and manufactures.

By reason of the deep, spongy soil formed by the decay of their leaves through a succession of years the forests become great storehouses of moisture. The rain which falls upon them, instead of being evaporated as it is from the open ground or flowing off at once into the streams, perhaps with destructive violence, sinks into the soft and retentive soil, from which it flows out gradually into the neighboring runlets and brooks and thence into the larger streams, and preserves in them an equable flow, preventive alike of flood and droughts. It is estimated that four-fifths of the water falling on wooded areas is retained by them, whereas on those which are without timber cover only one-fifth is retained, the other four-fifths rushing off in torrents and often producing disastrous floods. Through many an under-ground channel, also, the stored-up water of the forests reappears in springs in the meadows and elsewhere, to slake the thirst of man and beast and give delight to old and young. The forests are thus our great regulators of water supply. They also protect us and protect our crops, our fruits, and our flocks from the violence of the winds. What we call a gentle wind is pleasant, but we all know that the air can move with destructive violence. We all know, also, how grateful is the shelter which a grove or even a narrow belt of trees affords from a cold wind. When the air is still it may be quite cold without occasioning us much discomfort; but when it is in motion it absorbs the heat of our bodies more rapidly by the more frequent contact of its particles with them, and this may go so far as to be very painful and, perhaps, destroy life. Now, the forests, or even a few rows of trees, greatly check the movement of the winds and thus protect us both from their chilling effect and their violence. They do the same for the crops in the farmer's fields and the fruits in his orchards. They prevent them from being withered and blasted by cold or hot winds or from being broken down by their force. People, in some of our western States especially, have found "shelter belts," as they are well called, almost indispensable to the successful cultivation of some crops.

By equalizing the temperature and moisture of the atmosphere as they do, and by other influences which they exert, the forests are also promotive of health. A region of forests, especially if it is elevated, is a healthful region. So we know what multitudes resort every year to the White Mountains of New Hampshire, and to the Adirondacks and the Catskills, or to the great forest regions of the South or of the Rocky Mountains, and how beneficial to health they find them.

In whatever aspect, then, we contemplate the forests we see that they are of the greatest value to us.

TREES IN THEIR LEAFLESS STATE.

As the season for Arbor Day and tree planting comes on, just before the buds begin to swell and are getting ready to cover the trees with a fresh mantle of leaves, it is well—as it is also when the leaves have fallen from the trees in autumn—to give attention to the bare trees and notice the characteristic forms of the various species, the manner in which their branches are developed and arranged among themselves, for a knowledge of these things will often enable one to distinguish the different kinds of trees more readily and certainly than by any other means. The foliage often serves as an obscuring veil, concealing, in part, at least, the individuality and the peculiarities of the trees. But if one is familiar with their forms of growth—their skeleton anatomy, so to speak—he will recognize common trees at once with only a partial view of them.

Some trees, as the oak, throw their limbs out from the trunk horizontally. As Dr. Holmes says: "The others shirk the work of resisting gravity, the oak defies it. It chooses the horizontal direction for its limbs so that their whole weight may tell, and then stretches them out fifty or sixty feet so that the strain may be mighty enough to be worth resisting."

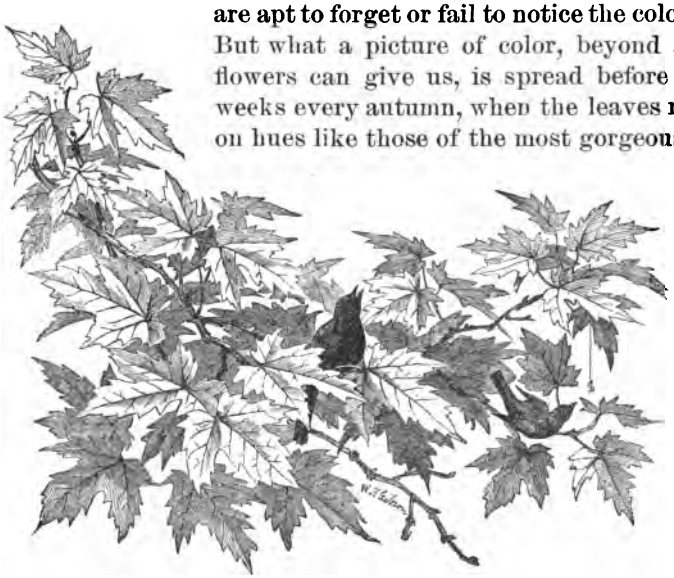
Some trees have limbs which droop toward the ground, while those of most, perhaps, have an upward tendency, and others still have an upward direction at first and later in their growth a downward inclination, as in the case of the elm, the birch, and the willows. Some, like the oak, have comparatively few but large and strong branches, while others have many and slender limbs, like some of the birches and poplars.

The teacher should call attention to these and other characteristics of tree structure, drawing the various forms of trees on the blackboard and encouraging the pupils to do the same, allowing them also to correct each other's drawings. This will greatly increase their knowledge of trees and their interest in them as well as in Arbor Day and its appropriate observance.

LEAVES, AND WHAT THEY DO.

The leaves of the trees afford an almost endless study and a constant delight. Frail, fragile things, easily crumpled and torn, they are wonderful in their delicate structure, and more wonderful if possible on account of the work which they perform.

They are among the most beautiful things offered to our sight. Some one has well said that the beauty of the world depends as much upon leaves as upon flowers. We think of the bright colors of flowers and are apt to forget or fail to notice the coloring of leaves. But what a picture of color, beyond anything that flowers can give us, is spread before our sight for weeks every autumn, when the leaves ripen and take on hues like those of the most gorgeous sunset skies, and the wide landscape is all aglow with them. A wise observer has called attention also to the fact that the various kinds of trees have in the early springtime also, only in a more subdued tone, the same colors which they put on in the autumn. If we notice the leaves carefully, we shall see that there is a great variety of color in them all through the year. While the prevailing color, or the body color, so to speak, is green, and the general tone of the trees seen in masses is green—the most pleasant of all colors to be abidingly before the sight—this is prevented from becoming dull or somber because it comprises almost innumerable tints and shades of the selfsame color, while other distinct colors are mingled with it to such an extent as to enliven the whole foliage mass. Spots of yellow, of red, of white, and of intermediate colors are dashed upon the green leaves or become the characteristic hues of entire trees, and so there is brought about an endless variety and beauty of color.



Then there is the beauty of form, size, position, and arrangement. Of the one hundred and fifty thousand or more known species of trees the leaves of each have a characteristic shape. The leaves of no two species are precisely alike in form. More than this is also true. No two leaves upon the same tree are in this respect alike. While there is

a close resemblance among the leaves of a given tree, so that one familiar with trees would not be in doubt of their belonging to the same tree, though he should see them only when detached, yet there is more or less variation, some subtle difference in the notching or curving of the leaf edge perhaps, so that each leaf has a form of its own. These differences of shape in the leaves are a constant source of beauty.

What a variety of size also have the leaves, from those of the birches and willows to those of the sycamores, the catalpas, and the paulownias. On the same tree also the leaves vary in size, those nearest the ground and nearest the trunk being usually larger than those more remote. How different as to beauty would the trees be if their leaves were all of the same size; how much less pleasing to the sight.

Then, what a wide difference is there in the position of the leaves on the trees and their relative adjustment to each other! Sometimes they grow singly, sometimes in pairs, sometimes in whorls or clusters. Some droop, others spread horizontally, while others still are more or less erect. The leaves of some trees cling close to the branches, others are connected with the branches by stems of various length and so are capable of greater or less movement. The leaves of poplars and aspens have a peculiarly flattened stem, by reason of which the slightest breath of wind puts them in motion.

These are some of the most obvious characteristics of the leaves, by which also they are made the source of so much of the beauty of the world in which we live. It will be a source of much pleasure to anyone who will begin now, in the season of swelling buds and opening leaves, to watch the leaves as they unfold and notice their various forms and colors and compare them one with another. There is no better way of gaining valuable knowledge of trees than this, for the trees are known by their leaves as well as by their fruits.

But let us turn now from their outward appearance and consider what is done by them, for the leaves are among the great workers of the world, or, if we may not speak of them as workers, a most important work is done in or by means of them, a work upon which our own life depends and that of all the living tribes around us.

Every leaf is a laboratory, in which, by the help of that great magician, the sun, most wonderful changes and transformations are wrought. By the aid of the sun the crude sap which is taken up from the ground is converted by the leaves into a substance which goes to build up every part of the tree and causes it to grow larger from year to year; so that instead of the tree making the leaves, as we commonly think, the leaves really make the tree.

Leaves, like other parts of the plant or tree, are composed of cells and also of woody material. The ribs and veins of the leaves are the woody part. By their stiffness they keep the leaves spread out so that the sun can act upon them fully, and they prevent them also from being broken and destroyed by the winds, as they otherwise would be. They

serve also as ducts or conduits by which the crude sap is conveyed to the leaves and by which, when it has there been made into plant food, it is carried into all parts of the tree for its nourishment. Protected and upheld by these expanded woody ribs, the body of the leaf consists of a mass of pulpy cells arranged somewhat loosely, so that there are spaces between them through which air can freely pass. Over this mass of cells there is a skin, or epidermis, as it is called, the green surface of the leaf. In this there are multitudes of minute openings, or breathing pores, through which air is admitted and through which also water or watery vapor passes out into the surrounding atmosphere. In the leaf of the white lily there are as many as 60,000 of these openings in every square inch of surface and in the apple leaf not fewer than 24,000. These breathing pores, called stomates, are mostly on the under side of the leaf, except in the case of leaves which float upon the water. There is a beautiful contrivance also in connection with these pores, by which they are closed when the air around is dry and the evaporation of the water from the leaves would be so rapid as to be harmful to the tree and are opened when the surrounding atmosphere is moist.

The green color of the leaves is owing to the presence in the cells of minute green grains or granules, called chlorophyll, which means leaf-green, and these granules are indispensable to the carrying on of the important work which takes place in the leaves. They are more numerous and also packed more closely together near the upper surface of the leaf than they are near the lower. It is because of this that the upper surface is of a deeper green than the lower.

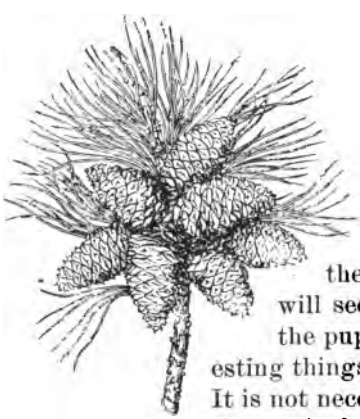
Such, then, is the laboratory of the leaf, the place where certain inorganic, lifeless substances, such as water, lime, sulphur, potash, and phosphorous, are transformed and converted into living and organic vegetable matter, and from which this is sent forth to build up every part of the tree from deepest root to topmost sprig. It is in the leaves also that all the food of man and all other animals is prepared, for if any do not feed upon vegetable substances directly but upon flesh, that flesh nevertheless has been made only as vegetable food has been eaten to form it. It is, as the Bible says, "The tree of the field is man's life."

But let us consider a little further the work of the leaves. The tree is made up almost wholly of oxygen, hydrogen, and carbon. It is easy to see where the oxygen and hydrogen are obtained, for they are the two elements which compose water, and that we have seen, the roots are absorbing from the ground all the while and sending through the body of the tree into the leaves. But where does the carbon come from? A little examination will show.

The atmosphere is composed of several gases, mainly of oxygen and nitrogen. Besides these, however, it contains a small portion of carbonic acid, that is, carbon chemically united with oxygen. The carbonic

acid is of no use to us directly, and in any but very minute quantities is harmful; but the carbon in it, if it can be separated from the oxygen, is just what the tree and every plant wants. And now the work of separating the carbon from the oxygen is precisely that which is done in the wonderful laboratory of the leaf. Under the magic touch of the sun, the carbonic acid of the atmosphere, which has entered the leaf through the breathing pores or stomates and is circulating through the air-passages and cells, is decomposed, that is, taken to pieces; the oxygen is poured out into the air along with the watery vapor of the crude sap, while the carbon is combined with the elements of water and other substances which we have mentioned, to form the elaborated sap or plant material which is now ready to be carried from the leaves to all parts of the plant or tree, to nourish it and continue its growth. Such is the important and wonderful work of the leaf, the tender, delicate leaf, which we crumple so easily in our fingers. It builds up, atom by atom, the tree and the great forests which beautify the world and provide for us a thousand comforts and conveniences. Our houses and the furniture in them, our boats and ships, the cars in which we fly so swiftly, the many beautiful and useful things which are manufactured from wood of various kinds, all these, by the help of the sun, are furnished us by the tiny leaves of the trees.

THE BEST USE OF ARBOR DAY.

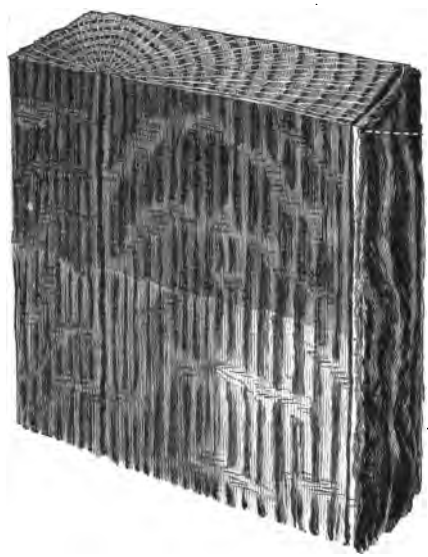


Arbor Day to be most useful, as well as most pleasant, should not stand by itself, alone, but be connected with much study and talk of trees and kindred subjects beforehand and afterwards. It should rather be the focal or culminating point of the year's observation of trees and other natural objects with which they are closely connected. The wise teacher will seek to cultivate the observing faculties of the pupils by calling their attention to the interesting things with which the natural world abounds. It is not necessary to this that there should be formal classes in botany or any natural science, though we think no school should be without its botanical class or classes, nor should anyone be eligible to the place of a teacher in our public schools who is not competent to give efficient instruction in botany at least.

But much may be done in this direction informally by brief, familiar talks in the intervals between the regular recitations of the schoolroom, or during the walks to and from school. A tree by the roadside

will furnish an object lesson for pleasant and profitable discourse for many days and at all seasons. A few flowers, which teacher or pupil may bring to the schoolroom, will easily be made the means of interesting the oldest and the youngest and of imparting the most profitable instruction. How easy also to plant a few seeds in a vase in the schoolroom window and to encourage the pupils to watch their sprouting and subsequent growth.

The pupils can also be readily interested in getting sections of trees so cut as to show the structure of the wood, and with a portion of the bark left upon them. It will require but a short time to accumulate quite a collection of such specimens in the schoolroom, and they will serve as a standard of reference with which to compare fresh specimens and identify them. One face of the sections should be smoothed and varnished, the others should be left as when split from the tree. The cut appended shows a good form for such sections.



Then it should not be difficult to have a portion of the school grounds set apart, where the pupils might, with the teacher's guidance, plant flower and tree seeds and thus be able to observe the ways and characteristics of plants in all periods of their growth. They could thus provide themselves with trees for planting on future Arbor Days, and at the time of planting there would be increased enjoyment from the fact that they had grown the trees for that very purpose.

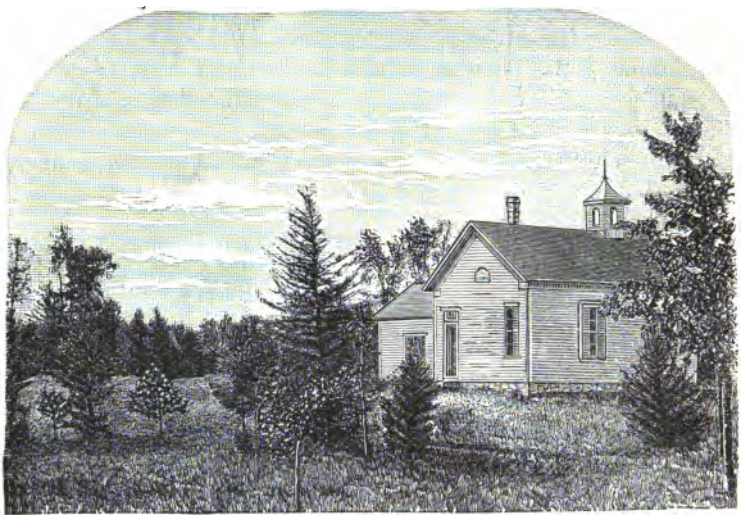
Why might not every schoolhouse ground be made also an arboretum, where the pupils might have under their eyes, continually, specimens of all the trees that grow in the town or in the State where the school is situated? It would require but a little incitement from the teacher to make the pupils enthusiastic with the desire to find out the different species indigenous to the region and to gather them by sowing seeds or planting the young trees around their place of study.

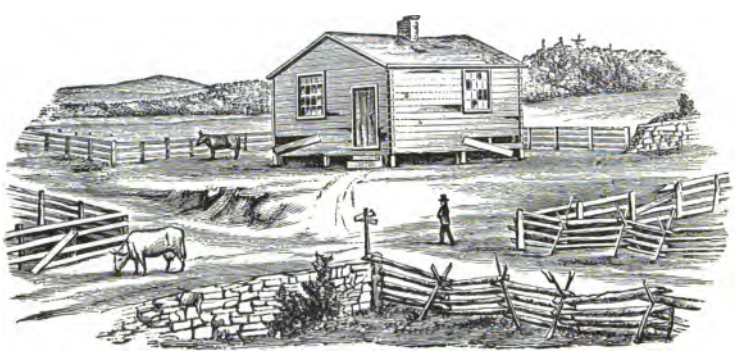
And if the school premises are now too small in extent to admit of such a use, let the pupils make an earnest plea for additional ground. As a general fact our school grounds have been shamefully limited in extent, and neglected as to their use and keeping. The schoolhouse in itself and in its surroundings ought to be one of the most beautiful and attractive objects to be seen in any community. The approach from the street should be like that to any dwelling house, over well-kept walks,

bordered by green turf, with trees and shrubs and flowers offering their adornment. Everything should speak of neatness and order. The playground should be ample, but it should be in a retired situation and by itself.

Europeans are in advance of us in school management. The Austrian public school law reads:

"In every school a gymnastic ground, a garden for the teacher,





according to the circumstances of the community, and a place for the purposes of agricultural experiment, are to be created."

There are now nearly 8,000 school gardens in Austria, not including Hungary. In France, also, gardening is taught in the primary and elementary schools. There are nearly 30,000 of these schools, each of which has a garden attached to it, and the minister of public instruction has resolved to increase the number of school gardens, and that no one shall be appointed master of an elementary school unless he can prove himself capable of giving practical instruction in the culture of

mother earth. In Sweden, in 1871, there were 22,000 children in the common schools receiving instruction in horticulture and tree planting. Each of more than 2,000 schools had for cultivation from one to twelve acres of ground.

Why should we be behind the Old World in caring for the schools? By the munificence of one of her citizens New York has twice offered premiums for the best-kept school grounds. Why may we not have Arbor Day premiums in all of our States and in every town for the most tasteful arrangement of schoolhouse and grounds? These places of education should be the pride of every community instead of being, as they so often are, a reproach and shame.

TREE PLANTING.

In considering tree planting in connection with Arbor Day, the first question to arise is, Where shall we plant? It is obvious that the practical work of Arbor Day can not include forest planting. That is a work so large and special in its nature as to require the combined effort of persons in an organized capacity, such as a town, county, or State, which shall either do the work outright or give such encouragement and help as will stimulate individual effort to the requisite degree. Arbor Day observances, to be sure, should not lose sight of the fact that we need something besides planting trees by the roadside or on the lawn, or here and there one in memory of some distinguished person; something more than the landscape gardener's art in planting appropriately public parks.[1]

These works of minor importance should lead to such a knowledge of the uses of trees in masses—the extensive forests—in connection with climate, with the flow of streams and consequently with agricultural operations and with manufactures, in short, with the general interests of household and business life, that in due time there will be developed a sentiment that will be powerful to arrest the wasteful and unnecessary destruction of our forests and insure the planting of them in places from which they have been removed or where they are specially needed. One thing is to be remembered and it is calculated to lend effectiveness to the work of Arbor Day. It is that trees are living and self-propagating things; that it is their nature to grow, and that they will grow and extend themselves on every hand if not interfered with and thwarted by man. As an illustration of this we see the abandoned farms on our hillsides soon filling up with a wood growth. It may not

[1] The Department of Agriculture has treated the subject of forest planting in Bulletin No. 5, "Forestry for Farmers," recently published.

be of the most valuable or desirable character, but it shows what nature is ready to do, and it indicates a direction in which the influence of Arbor Day may be made effective.

Let it be understood that the hills and mountain slopes are worth more for the growth of trees than for agricultural use, or rather that the tree crop is the most appropriate agricultural crop for the hill and mountain slopes, the rocky surfaces which resist the plow and the hoe. Let the farmer learn that if he will but exclude from his woodlands the browsing cattle, which are ready to eat off every tender tree as it sprouts from the ground and to break down with their heavy bulk those which have already attained a hopeful size, and if he will cull the inferior trees instead of the best, for his occasional uses, and fill the too wide vacant spaces with a judicious planting, he may soon have a woodland, though it may not have the dimensions of a forest, which will be of manifold benefit to him as well as to others and be increasing in value from year to year. This use of elevated and rocky lands, where ordinary agriculture is difficult and comparatively unremunerative, ought to be encouraged by the Arbor Day movement. It may and should make itself felt in this direction.

The same is true in reference to many sandy and swampy lands. These will nourish trees and prove a perpetual source of income. Trees, unlike the ordinary farm crops, continually improve the quality of the ground on which they grow. The German Government, in its wise and careful management, is constantly buying up the worn-out or impoverished farms of its husbandmen and by stocking them with trees restoring their fertility and fitting them again for agricultural use. On a great many of our light, sandy soils, now left as wind-swept barren fields or yielding only the most meager crops, a growth of that most valuable tree the white pine (*Pinus strobus*), may be secured in twenty years and even less, of marketable size. There is a great demand for the wood of this tree in its early stages, for the manufacture of staves, for tubs and small casks, as well as for other uses, and many landowners are finding it quite profitable to raise and market this pine at a comparatively early age.

This is not the place to discuss further the subject of forest planting or forest preservation, unless it be to say that perhaps a greater enemy of the forest than the ax is fire, and that wherever there is regard enough for trees to occasion the observance of Arbor Day there ought to be also consideration enough for the preservation of the forests of the vicinity to inaugurate some well-arranged and efficient plan to protect them from the flames which, kindled by accident or carelessness, are not only a detriment to the legal owner of the forest but to the whole community, for, in an important sense, the forests are common property. By their beauty, their influence upon climate and water supply, they are of benefit to all who live in sight of them and may be to those more distant from them. All, therefore, ought to be ready to make their preservation a common cause.

STREET PLANTING.

Forests apart, if the question arises where to plant, nearly all will say plant along the borders of the streets. This is natural and right, and so the first thing which the village improvement societies, which have sprung up so abundantly of late, have done has been to plant trees on the roadsides. Unfortunately, also, this has too often been the last thing. Village improvement has frequently exhausted itself by the wayside. This speaks well for the general estimate of trees, however it may speak for the people's estimate of what constitute the needs or the possibilities of village life.

Lane at Darlington, Md.

Certainly no one thing adds so much to the appearance of town or village, or affords so much outward comfort to its people, as to have its streets properly planted with trees. As a source of embellishment nothing can surpass it. How much would it detract from the charm of Washington, celebrated for beauty on account of its broad streets, ample parks, and the plan on which they are constructed, if its 80,000 or more trees which border those streets and adorn those parks were removed? Washington would be distinctly another city than it now is. But what is true of the National Capital is true of the smaller town or village. The difference is not in kind, but only in scale or dimension.

In deciding, however, what trees are most desirable for street or roadside planting, no little difficulty arises. No general list can be

made for such an extensive country as ours. Trees which will grow well and are all that can be desired in one portion of it are not suitable for another. Trees which are at home on the Pacific Coast will pine away and die on the Atlantic. Even in localities separated by only a few miles the same kinds of trees may not flourish. Differences of soil and climate, or a particular exposure, determine to a great extent what trees are to be chosen if we would be successful in our planting. In cities, the prevalence of smoke in the atmosphere, or the escape of illuminating or other gases, complicate the problem and make the selection additionally difficult.

The American Forestry Association appointed a committee several years ago for the purpose of making a list of trees most desirable for

Street tree planting.

street planting, but the committee has not yet reported. To make a list large enough for the whole country would be to include so many trees that it would be of little use for any particular locality, and to make one for a given place would be of little use to the country at large. Each locality must have its selection of trees made with reference to its particular circumstances. Happily, we have an unusually large variety of trees, excelling by far that of any other country, which admits a choice of valuable kinds adapted to every situation. Trees can, indeed, be acclimated, as people can, and when removed from their native places to other and different ones can be made to adapt themselves to their new environment. Their growth, however, is apt to be more or less feeble

and unsatisfactory. Trees have their natural homes, in which they attain their best development. The geologist, as he may be traveling swiftly over the country, can ascertain the character of the soil, its mineral composition, from the prevailing kinds of trees which from time to time meet his sight.

Some trees are less particular than others in their choice of climatic or soil conditions, and therefore are available for planting over a wider range of territory and under a greater variety of exposure. They will have their places, consequently, in many lists of desirable trees.

The Tree Planting and Fountain Society of Brooklyn, N. Y., a few years ago sent a request to various nurserymen, landscape architects, practical arboriculturists, and private citizens in different parts of the country for a small list of what they deemed the most suitable trees to be recommended for planting on the streets of Brooklyn, a general description of the character of the soil of the city having been sent with the request. Three classes of trees were asked for—large, medium sized, and smaller, for wide streets, narrow ones, and those of intermediate width. The lists received were interesting as showing the varying estimates of the same tree by different persons and also the substantial agreement of the same persons in regard to a large number of trees.

Fifteen lists were sent in, and in all about sixty trees were recommended. Of these the Norway maple was most frequently found on the lists, followed in the order of preference by the sugar maple, oriental plane, laurel-leaved willow, silver maple, European linden, American elm, sweet gum, catalpa, yellowwood, pin oak, white oak, American linden, or basswood, hackberry, scotch elm, kœlreuteria, and tulip poplar. The other trees on the lists were named only in one or two instances each.

In another list, sent from the Division of Forestry of the Department of Agriculture, and in which the rating of the trees was made up from a consideration of eight separate points, viz, endurance, or ability to withstand more or less unfavorable conditions, recuperative power, or ability to heal wounds and outgrow other injuries, cleanliness, beauty of form, abundance of shade, extent of the season when in leaf, rapidity of growth, and length of life period, the trees stood rated in the three classes thus:

LARGE-SIZED TREES.

Red oak (*Quercus rubra*), 22.
Scarlet oak (*Quercus coccinea*), 22.
Yellow oak (*Quercus tinctoria*), 22.
American elm (*Ulmus americana*), 22.
Sugar maple (*Acer saccharinum*), 19.
Black maple (*Acer nigrum*), 19.
Tulip tree (*Liriodendron tulipifera*), 19.
European linden (*Tilia vulgaris*), 19.
Sweet gum (*Liquidambar styraciflua*), 19.
White oak (*Quercus alba*), 19.
Burr oak (*Quercus macrocarpa*), 19.
Oriental plane tree (*Platanus orientalis*), 19.
Kentucky coffee tree (*Gymnocladus canadensis*), 19.
American plane tree (*Platanus occidentalis*), 18.
Sycamore maple (*Acer pseudoplatanus*), 19.
American linden (*Tilia americana*), 17.

MEDIUM-SIZED TREES.

Red maple (*Acer rubrum*), 22.
Shingle oak (*Quercus imbricaria*), 21.
Willow oak (*Quercus phellos*), 21.
Slippery elm (*Ulmus fulva*), 21.
Norway maple (*Acer platanoides*), 20.
Box elder (*Negundo aceroides*), 20.
European elm (*Ulmus campestris*), 19.
Scotch elm (*Ulmus montana*), 19.
Hackberry (*Celtis occidentalis*), 19.
Silver-leaved maple (*Acer dasycarpum*), 17.
Tree of Heaven (*Ailanthus glandulosus*), 16.
Horse chestnut (*Æsculus hippocastanum*), 16.
Japanese sophora (*Sophora japonica*), 16.
Hardy catalpa (*Catalpa speciosa*), 16.
Ginkgo or maiden hair tree (*Ginkgo biloba*), 16.
Honey locust (*Gleditsia triacanthos*), 15.
Cottonwood (*Populus monilifera*), 15.
Balm of Gilead (*Populus balsamifera var. candicans*), 15.
Black locust (*Robinia pseudacacia*), 14.

SMALL-SIZED TREES.

English maple (*Acer campestre*), 21.
Round-top locust (*Robinia pseudacacia-form*), 18.
Red horse-chestnut (*Æsculus rubicunda*), 17.
Laurel-leaved willow (*Salix pentandra*), 17.
Bay willow (*Salix laurifolia*), 17.
Green ash (*Fraxinus viridis*), 16.
European mountain ash (*Sorbus aucuparia*), 15.
American mountain ash (*Pyrus americana*), 15.
Yellowwood (*Cladastris tinctoria*), 15.

The rating of trees in this list does not differ essentially from the average rating of the lists already referred to. Such lists can not be taken as authoritative or decisive, but only as helps. Persons of equally good judgment will differ in their estimate of particular trees, and time and trial will be needed in order to reach a final decision as to the trees best adapted for use in any given place.

It hardly needs to be said that it is only on broad streets or where buildings are set well back from the street that such widespreading trees as some of the oaks are desirable for planting; but the oaks are among our best trees where there is room for them, and they should be planted on our streets much more than they have been. For ordinary streets, and especially for those which are narrow, such trees should be chosen as do not grow to large size or such as are spiry topped. Of the latter a new comer among us may be favorably mentioned, the ginkgo. This is one of the few trees which it seems desirable to cultivate in addition to the large number of valuable native trees which we have. But the peculiarity of its form and of its leaves, which mark a blending of the broad-leafed and the needle-shaped leaves, and its wonderful golden coloring in autumn, make it very attractive, and it is well adapted for planting on narrow streets as well as singly in open, lawn-like spaces. Whoever has seen the avenue leading up to the main building of the Department of Agriculture, which is bordered with the ginkgo, must feel that it is one of the most desirable trees for similar use. What degree of cold this tree will endure remains to be seen, but it is growing well as far north as Boston.

A good word should be said also for the ailanthus. It was formerly a favorite tree, but has been discarded on account of its unpleasant odor in its flowering season. This, however, may be avoided by planting

only the pistillate trees, as the odor is noticeable from the staminate trees only. Professor Sargent speaks of the ailanthus as "probably the best street tree that has ever been used in northern cities."

PLANTING ON SCHOOL GROUNDS.

Where Arbor Day is observed by the schools it will, perhaps, seem that tree planting on the school grounds deserves consideration before planting on the street borders; but the two are nearly related. If an attempt is made to plant around the schoolhouse, some street planting will almost necessarily be done in connection with it. Certainly the pupils of any school should be encouraged to plant trees about the building to which they come day after day and where so much of their time is spent. They should be encouraged to make it beautiful and attractive now with foliage and flowers, and a place to which they may look back in after life with pleasant memories.

Even the smallest school ground is large enough to admit some embellishment of tree or shrub, and even a single tree will add attractiveness to the place. Such a tree planted by the children themselves will be regarded as their common property. All will be interested in it and will combine to protect it and give it all needed care. In so doing they will learn manifold lessons in regard to tree growth and habits, in regard also to the ways of the birds and insects which will frequent it. While they are cultivating the tree they may also be cultivating in themselves the best traits of character and gaining as much as from their books. But it is to be hoped that most of our school grounds are ample enough to admit of a considerable number of trees and shrubs and flowery plants besides. Then there will be opportunity for planting a variety of trees and for a careful study in order to select the best, both for beauty and for adaptation to the place where they are to stand and grow. Care should be taken that the planting of the school grounds shall not be done hastily or without due consideration, nor that too much be done in a single season. Leave some work to be done in coming years to give new zest to the Arbor Day exercises. One tree well chosen and well planted is worth a dozen or a score selected and planted as trees often are.

With many persons a tree is a tree, and peculiarities of nature or habit of growth are taken little account of. It is enough also with many, in planting, if a hole is made in the ground and the roots of the tree, many or few, are thrust into it and hastily covered with earth again. One of the most difficult things to do is to get a tree properly planted, and yet tree planting is a very simple thing. It consists in taking a tree out of the ground without injury and placing it in the ground again in another place also without injury, and with a corresponding connection with the soil such as it had before. This simply requires time, patience, and care. Yet in planting a single tree a boy may learn a lesson of lifelong value to him.

The life of a tree depends upon its roots. Through them it gets its nourishment. But it is not through those which are large and most visible. It is through the finest roots, and still more the scarcely visible root hairs which are most abundant on the fibrous rootlets. The large roots serve as braces to hold the tree in erect position and keep it from being swayed and overthrown by the winds, and also as conduits through which the water and nourishment gathered by the rootlets are conveyed to the stem and thence to the branches and leaves. The large roots are of no use in securing the life of the newly planted tree or promoting its growth, if the rootlets are broken off or left behind when the tree is taken from its original place.

Hence the need of time and care in undertaking this removal. The roots, even in a young tree, will have spread to a considerable distance from the stem and to follow them and detach them from the soil adhering to them without breaking the tender threads is not easy. It is necessarily a slow though a simple process, and we are apt to be impatient and wish to do the work quickly. But the old proverb, "Haste makes waste," is as true here as anywhere. So is another that "What is worth doing is worth doing well." To plant a tree properly, so that it shall go on to grow vigorously and as though nothing had happened to impair its vitality, instead of barely making a feeble show of life for a while only to have a lingering death, is to give the pupils of a school an object lesson to last them and be of use to them for a lifetime. To make the lesson the more obvious and impressive, let them, under the guidance of the teacher or some one accustomed to handle trees, plant one properly, first preparing the ground where it is to have its new home, by excavating a sufficiently large hole to receive all the roots of the tree with space enough beyond to allow their unimpeded growth for years to come, carefully reducing the earth to such a fine condition that it can be brought into close contact with the smallest roots. Then, having selected the tree beforehand, let it be so taken from the ground as to preserve all the thread-like roots and replaced as soon as possible in the ground prepared for it, the roots being carefully spread out and the fine, soft soil everywhere brought into close contact with them.

Now, to make more clear the advantage of such a planting, it may be well to plant another tree in the way that trees are so commonly planted.

Let some ordinary workman be sent to bring a tree from the woods. He will probably, with three or four thrusts of his sharp spade, sever the main roots of the tree at about the distance of a foot from the stem and then wrench the tree from the ground, rudely breaking off what roots have not been cut already, and will bear off the tree with a triumphant feeling that he was stronger than its "plaguey roots." Then he will make a hole in the ground just large enough to permit him to crowd the lacerated roots into it, with much twisting and turning, and then, heaping upon them the hard, lumpy ground, he will stamp it upon the roots and consider the tree planted, as he will say, perhaps, "in less than no time." It would have been better, probably, if he had not spent even so much time as he has upon it, as the school children will be likely to see to their satisfaction before the summer is over; but they may also learn a lesson in tree planting worth the cost of the life of one tree. It has been stated recently, on good authority, as an illustration of improper planting, that of some hundred trees planted a few years ago on the streets near Morningside Park, New York, every one has died or been removed because of its diseased or dilapidated contion, and replaced by another.

Prof. J. T. Rothrock, forest commissioner of Pennsylvania, in reply to a request for some suggestions in regard to the most profitable observance of Arbor Day, sends the following, bearing on this subject, which is most timely:

In my judgment, one of the most important factors in Arbor Day celebration is space. We have had but few Arbor Day celebrations as yet in this State; yet, as I go over the Commonwealth, I find that already the question presses, Where to plant next year's trees in many of our contracted school grounds? The fact is, we have nowhere in this country recognized as we should how important it is to have large areas attached to our schools. There should be room for all legitimate plays; ample space for a typical, well-grown specimen of each species of native tree. Then, there should be a nursery where each child could plant seeds and nuts of our trees and watch them sprout and push out of the ground and see by what steps they became trees.

Furthermore, this school lot should not be the refuse land of a school district. It should be well situated, have abundant water, and as much variety of soil and exposure as possible. It is clear, if these suggestions have any value, that 5 acres is the least space that any country schoolhouse should have.

It is time for us to recognize the fact that ground dedicated to educational purposes should be as sacred as if set apart for a church. We should look down the coming centuries in forming our plans for it, and anticipate and prepare for a time when mature oaks will transmit the love and traditions of the place from one generation to the next. The school located in such surroundings would soon come to be recognized as a valuable possession. It would be the one cheerful spot in which the whole community had an ownership, the place of deposit of the public library, and the place where the public meetings would be held.

This may all seem utopian. But it is coming. The very hardest lesson for us all to learn is that the world moves faster than we do. More than this, it moves in spite of us, and the next century will probably not be very old before it has moved into a higher appreciation of the value of large and well-kept school grounds. Our successors will feel that space which is too small, and land that is too poor to attempt to raise a crop of grain upon, is also wholly inadequate to the larger work of raising a crop of vigorous, liberal-minded, law-abiding citizens upon.

PLANTING ON LAWNS AND IN PARKS.

After what has been said of planting on streets and school grounds little needs to be added in regard to tree planting on larger spaces, such as lawns, parks, and other open places. The same trees may be used in general, but no such restrictions being necessitated as in the case of street planting, the selection may be made from a greater number of trees. For example, trees whose beauty depends upon their branches starting near the ground, so that the tree will be a solid mass of verdure resting upon the earth's surface, are not appropriate for street planting, where the branches must all be so high from the ground

An old Maine homestead.

as to admit of unimpeded passage under them. Many other trees also would be misplaced upon a street border which are well adapted for use on a lawn or other open space.

No such uniformity in size or habit of growth is necessary in the case of lawn or park plantations, as in roadside planting. Landscape effects are here to be sought, and in securing them there is no limit hardly in the choice of trees, except in their adaptation to the soil and climate of the place to be planted. Here, as in all cases of planting, the first choice of trees should be made from those which are indigenous to the locality. This being done, others may be brought from a distance for the sake of increasing variety, or on account of their special merits, care being

taken to procure them from localities corresponding as nearly as may be in climatic and soil conditions to the region where it is proposed to plant them.

AIDS TO SUCCESS IN PLANTING.

It will conduce much to success in planting if trees are procured from nurseries rather than from the woodlands or other uncultivated places. In the nursery grounds the soil is in a light and soft condition, and the trees as they grow are frequently transplanted. This occasions a dense root growth close to the stem, and it enables the tree to be taken from the ground with comparatively little danger of breaking the roots, and the replanting is also accomplished with the greater facility.

Another aid to success, that is, to secure a healthy and vigorous growth of trees, will be found in giving them an ample bed of deeply trenched and well-broken soil when the planting takes place; and if the soil is poor or of too hard and compact a character, by removing it and putting in its place a liberal supply of soil of better structure and abounding in plant food. The present labor and expense involved in doing this will be amply compensated by the appearance of the trees in the subsequent years of their growth. The chief dependence of trees for the promotion of their growth is a sufficient supply of water, out of the constituents of which their bodies are largely built up, and which is the vehicle by means of which the mineral food in the soil is conveyed to all parts of their structure.

It is more important, therefore, that the soil should be of proper physical structure than that it should abound in desirable mineral ingredients. If the soil is hard or clayey, so that water can not penetrate it readily, or if it is coarse-grained and very porous, so that water falling upon it sinks rapidly to the depths below, the roots of trees will fail to obtain such a supply of moisture as is needful for a vigorous growth. They will have but a feeble vitality. Hence the need of having a soil which is of such texture as readily to admit the rains which fall upon it and yet such as to prevent the water from rapidly passing out of reach of the roots. In proportion as the soil is fine it presents a larger surface of moisture to the minute roots of plants.

It will conduce to the proper supply of moisture also if the ground above the tree roots, especially at the first planting, is covered with a mulch of straw or litter of some sort which, by shielding it from sun and wind, will prevent the evaporation of moisture from the soil and to that extent increase the amount at the disposal of the trees. Few understand how much water is removed from the ground by the influence of the sun and winds, especially the latter. One of the chief difficulties in the way of securing a desirable tree growth in many parts of the country, particularly on the Western plains, arises from the prevalence of strong and often hot winds. In the existing forests the trees are protected from the effects of evaporation by the canopy of shade afforded by their leafy tops and by the mulch of fallen leaves accumu-

lated year by year at their base. Where there are not reasons forbidding it we can do nothing better to promote the healthful growth of the trees we plant than to allow the annual fall of leaves to remain upon the ground above the roots and thus form a perpetual mulch of protection for the trees.

METHOD OF PLANTING.

Little is necessary to be added to what has been said in different parts of this pamphlet as to the proper method of planting. The whole matter may be summed up by saying that a tree or plant should be taken from the ground with as little disturbance or impairment of its root system as possible and set in its new place of growth with such care as not to harm its roots, but to bring them all into close contact with the soil, by pressing it firmly around and upon them, thus giving them opportunity at every point to absorb from the particles of soil the moisture necessary for the steady and healthful growth of the tree, and leaving no vacant spaces to promote decay or lessen the supply of moisture. This is the most important thing to be secured. Care should be taken also in conveying the tree from the place from which it is taken to the place of planting not to allow the roots to become dry by exposure either to the sun or the wind. Especially should it be so in the case of evergreen trees, which have a resinous sap. If this sap becomes hardened by exposure to sun or wind, it is nearly impossible to restore its fluid condition so that it will perform its part in the circulatory system, and the tree may be considered dead already.

OPINIONS OF REPRESENTATIVE MEN.

The State of Nebraska having, a few years ago, made its Arbor Day to coincide with Mr. Morton's birthday, the editor of one of its newspapers issued, in 1888, a special Arbor Day number of his paper. Prominent among the features of that issue was a collection of letters received, in response to the editor's invitation, from a large number of persons distinguished in public life or otherwise, expressing their appreciation of Arbor Day and their regard for its author. It seemed that the sentiments therein expressed, which so justly set forth the merits and importance of Arbor Day, ought on that account to have a place in the present publication. Portions of a few of the many letters received are therefore inserted here:

I willingly confess so great a partiality for trees as tempts me to respect a man in exact proportion to his respect for them. He can not be wholly bad who has a sympathy with what is so innocent and so beautiful. But quite apart from any sentimental consideration, the influence of trees upon climate and rainfall gives to

the planting of trees, and to the protection of them where nature has already planted them, a national importance. Our wicked wastefulness and contempt for the teaching of science in this matter will most surely be avenged on our descendants. Nature may not instantly rebuke, but she never forgives, the breach of her laws.

I am glad, therefore, to join in this tribute of friendly gratitude to the inventor of Arbor Day. I think that no man does anything more visibly useful to posterity than he who plants a tree. I should answer the cynic's question, "What has posterity done for me that I should do anything for it?" by saying that it is all the pleasanter to do something for those who can do nothing for us.

Marco Polo relates that the great Kublai Khan planted trees the more willingly because "his astrologers and diviners told him that they who planted trees lived long." Let me hope that this may prove true in the case of Mr. Morton.—James Russell Lowell.

No instructed agriculturist is unacquainted with the ameliorating influence on climate, rainfall, freshet, windstorms, etc., produced by the liberal planting of trees on waste lands. The cheering thing has been that the same wise ideas have crept into the minds of our people and made them set resolutely to work in carrying out the simple, practical, and benignant suggestion of Mr. Morton.

An essay might be written on this topic by any thoughtful man acquainted with the phenomena of meteorology, and if Mr. Morton's plan shall be persevered in by the whole country, nature herself will write that essay in beautiful style before a quarter of a century is passed.—George H. Boker.

The best and highest thing a man can do in a day is to sow a seed, whether it be in the shape of a word, an act, or an acorn. Last year, on less than half an acre of ground, at my summer home by the seaside at Hull, I planted 227 individual lives, of creeper, shrubs, and tree. All through the winter, from the city, my mind reached out, as it were, to observe and care for the young things in their strange soil. Last week I went to see them, and Mr. Morton will know the thrill of pleasure, unlike all other pleasures, which came from the signs of health and growth in the plants.—John Boyle O'Reilly.

It is not very long since, especially in the Eastern States, when the enemy of the tree was considered the friend of the human race, but the time has now come when the friend of the tree is the friend of the race.

Mr. Morton deserves the gratitude of the whole land. How many naked spots on this vast continent will be clothed in verdure by reason of his happy suggestion! The birds and animals, as well as the people, profit by his wise forethought. Every tree planted upon this day will serve to keep green his memory.—John Burroughs.

If, as has been wisely said, he is a public benefactor who causes two blades of grass to grow where only one grew before, we well may honor the man to whom his country will owe, in the near future, so many beautiful groves and orchards and trees, blessing with their shade its village streets.—J. T. Trowbridge.

Most of the States have sinking funds with which to provide for debts not yet due. It would be a simple and wise policy for a State to invest a considerable sum annually from its sinking fund in forest. Individuals hesitate about a form of investment which does not pay for many years. A State need not hesitate, because it does not need the money for many years. A State has also the power to make and enforce the laws which will protect its forests.—Edward Everett Hale.

The practice of systematic tree planting is a most excellent one, and those who have encouraged and promoted it deserve well of their country. I am very glad that the West has been roused to a sense of the importance of planting trees, and hope that all parts of the country will soon feel the necessity of preserving them.—Francis Parkman.

The material benefits of Arbor Day alone are incalculable, for it makes the barren land fertile and the desert plain green with beauty.

But these material benefits, great as they are, are small compared with the moral effect on the mind and heart of the people. In the young, especially, it enriches the taste, cultivates the love of beauty, and provides pleasant, healthful impressions that never will be obliterated. The love of trees, I think, has a more elevating effect than even the love of flowers; it is more strong and invigorating.

Besides all these immediate benefits, Arbor Day reaches far beyond the localities where it is observed. The young, gathered in certain sections, eventually become scattered and have homes of their own. The influence of this day will follow them there, and under the influence of their early cherished impressions trees will be planted, not only around their dwellings, but along the roads and water courses of the place in which they live, and thus cover the land with beauty and blessing.

All honor, then, to the founder of Arbor Day. The sculptor's art could not erect so noble a monument to his memory as loving hands and hearts are rearing and shall rear to it all over this barren land.—J. T. Headley.

All lovers of nature may well rejoice in the establishment of Arbor Day, and join in doing honor to the founder of an institution so beneficent.—Thomas Wentworth Higginson.

Whatever makes a village or town more attractive promotes that local pride and public spirit which are the vital and conservative forces of a great republic; and, if the planter of one shade tree is a public benefactor, what shall we say of him who stimulates the planting of whole groves and forests?—George William Curtis.

The observance of Arbor Day is aiding in bringing about a realization of the needs of our forestry interests, and will ultimately make the whole country equal to the occasion of a methodical, systematic forestry management.—B. E. Fernow.

Many people, often among the most intelligent, when they first hear of Arbor Day, look upon it as a kind of sentimental feast quite out of date in our matter-of-fact generation, but upon a closer inspection they soon discover its practical value.—H. G. Joly.

Prior to 1872 no system of forestry had been attempted in the United States. The spasmodic efforts of tree planting upon a small scale, with very rare exceptions, were attended with the most unsatisfactory results.

Forests were cut away without system and without thought of future condition or wants until it was self-evident that unless some judicious and comprehensive forest policy was adopted, this continent, once bristling with its primeval forests, would be permanently deprived of an element which constitutes a most important part in the economy of nature.

Forestry, no less than science, is a development of civilization. Colbert was instrumental in preventing the useless waste of the forests of the old world, but the honor of bequeathing to future generations an invaluable legacy of the perpetuation of forests was reserved for a philanthropist of a more advanced age.

There is no State in the Union but needs such a legacy, and when that which is now observed in twenty-eight States becomes a national holiday, then will each citizen have left to him and to his heirs forever, under a seal greater than that of Cæsar's, "private arbors and new-planted orchards."

If a John Howard, ameliorating the evils of convict life and alleviating the sufferings of prisoners, can be called the "world's philanthropist," surely he who originates measures which tend directly to the improvement and fertility of the land and the wealth and comfort of the inhabitants, adding as many dollars to the world's exchequer as the mines of uncoined ore produce, and more rays to the brightness of the world's civilization than the electric spark has generated, is not least among fellow men.—A. J. Sawyer.

No man now living has done more to beautify and enrich his State and country than he. Millions upon millions of green and living monuments attest his forethought and his worth; and as these trees grow and expand in beauty, so will the love of this great benefactor increase in the hearts of our people.—John B. Peaslee.

The wisdom and pertinency of Jonathan Swift's saying may now well be recalled: "And he gave for his opinion that whoever could make two ears of corn or two blades of grass to grow on a spot of ground where only one grew before would deserve better of mankind, and do more essential service to his country than the whole race of politicians put together."

If this were true of two ears of corn or blades of grass, how much more of a tree.—T. F. Bayard.

Tribute of fruits be his, and glossy wreaths
From roadside trees, and his the people's love,
When east and west the wind of summer breathes
Through orchard, shaded path, and sighing grove.
—[E. C. Stedman.

SUGGESTIONS FOR PROGRAMMES.

It is not necessary to give even a specimen programme for the observance of Arbor Day. If any attention to the subject is given beforehand a teacher can hardly fail to arrange a scheme of exercises that will be both interesting and profitable, and the pupils will not be slow to offer suggestions which will be worthy of consideration, and the more they are allowed to have a voice in the arrangements the more interested will they be in the actual doings of the day, and the more beneficial also will these be to them.

The exercises will naturally begin with the reading of the proclamation of the governor of the State or of the superintendent of public instruction, by which the day is fixed, or by the law setting apart the day for special uses. Any or all of these may be read. They will give dignity and impressiveness to the whole service. One or more selections from the Bible, indicating the high moral and religious lessons which the trees afford and the conspicuous place which they have in our sacred Scriptures, may fitly follow.

Other particular features of the Arbor Day exercises will be determined by the character of the school, the age of the pupils, the studies they are commonly engaged with, and various other considerations.

Teachers will bear in mind that the observance of Arbor Day has behind it a serious purpose, and that it is not simply an occasion for the children "to have a good time." It looks to their education in what is highest and noblest, to bring their minds into contact with the best thoughts of other minds, and kindle in them the purest and best feelings. It aims to open their hearts to the sweet and precious lessons which come from intercourse with nature, to make them unselfish, con-

siderate of one another and of all around them, and to prepare them to lead noble and useful lives.

In view of the duties of citizenship which are soon to devolve upon them care should be taken to make the patriotic feature of the exercises for Arbor Day prominent. Trees should be planted in memory of men who have nobly served their country. Patriotic songs should be sung, and the national flag should be displayed in the schoolhouse and on the march to plant the trees. Selections abounding in patriotic sentiments should also be read or recited. We have given a few specimens of appropriate character from various authors and have made reference to more, but the pupils should be encouraged to find others still.

The endeavor should be made to give the exercises a varied character, adapting them to the younger pupils not less than to the older. On this account songs and recitations of light and seemingly, perhaps, of somewhat trivial character may be allowed a place in company with those of higher grade. Let the youngest pupils become interested in Arbor Day as soon as possible, if it be only at first by songs of birds and flowers.

The programme for the day's observance will be imperfect if it does not include as one of its items an account given by some pupil of the object of Arbor Day, describing its origin and purpose, and the ends which are sought to be accomplished by it. This should be kept in mind by distinct reference to it from year to year.

In places so large that the schools can not well be combined in celebrating Arbor Day it will conduce to the greater interest and resulting benefit of the exercises if a generous rivalry is stimulated between the schools in the endeavor to see which will have the most interesting and pleasing programme.

Many schools have been accustomed to adopt by vote some tree as their emblematic tree or badge. This naturally causes the pupils to give special attention to that particular tree and on Arbor Day to make it the subject of essays, recitations, and songs, thus giving it the chief place in the exercises. The result may easily be made to be such a knowledge of that particular tree as will be pleasant and valuable for a lifetime. The choice of other trees in the same way from year to year will form a very pleasing method of learning to distinguish the various species of trees from each other and to know their habits and uses.

It is desirable that an address, or more than one, by some thoughtful person, invited for the occasion, should form a feature of the day's exercises. But the pupils should be expected to furnish essays for the occasion on appropriate subjects, and to prepare them carefully. There is given in this bulletin a considerable list of such subjects, but one by no means exhaustive, only suggestive of the many which readily offer themselves for consideration.

Then there is a large field for recitations and declamations appropriate for the day. A considerable number of such may be gathered from the essays in the earlier part of this publication, but our literature abounds with them, and teachers should encourage their pupils to become familiar with them, committing many of them to memory, thereby enriching their minds with gems of thought to be their delightful possession for life and a constant incentive to what is noblest, purest, and best.

MISCELLANEOUS READINGS.

We can hardly see or think of trees without being reminded of Mr. Lowell. He was eminently a lover of trees, and they were the inspiration of some of his best prose and poetry. This love of trees led him to call his pleasant place of residence, in Cambridge, "Elmwood." And no memorial of him would be more accordant with his own feelings than a growing tree. This is abundantly shown by the following letter, written only a few years ago, when it was proposed in one of our schools to plant on Arbor Day a tree in his memory:

"I can think of no more pleasant way of being remembered than by the planting of a tree. Like whatever things are perennially good, it will be growing while we are sleeping, and will survive us to make others happier. Birds will rest in it and fly thence with messages of good cheer. I should be glad to think that any word or deed of mine could be such a perennial presence of beauty, or show so benign a destiny."

THE OAK.

What gnarled stretch, what depth of shade is his!
  There needs no crown to mark the forest's king;
How in his leaves outshines full summer's bliss!
  Sun, storm, rain, dew, to him their tribute bring,
Which he, with such benignant royalty
  Accepts, as overpayeth what is lent;
All nature seems his vassal proud to be,
  And cunning only for his ornament.

How towers he, too, amid the billowed snows,
  An unquelled exile from the summer's throne,
Whose plain, uncinctured front more kingly shows,
  Now that the obscuring courtier leaves are flown.
His boughs make music of the winter air,
  Jeweled with sleet, like some cathedral front
Where clinging snowflakes, with quaint art, repair
  The dents and furrows of Time's envious brunt.

How doth his patient strength the rude March wind
  Persuade to seem glad breaths of summer breeze,
And win the soil that fain would be unkind,
  To swell his revenues with proud increase!
He is the gem; and all the landscape wide
  (So doth his grandeur isolate the sense)
Seems but the setting, worthless all beside,
  An empty socket, were he fallen thence.

So, from oft converse with life's wintry gales,
  Should man learn how to clasp with tougher roots
The inspiring earth—how otherwise avails
  The leaf-creating sap that sunward shoots?
So every year that falls with noiseless flake
  Should fill old scars up on the stormward side,
And make hoar age revered for age's sake,
  Not for traditions of youth's leafy pride.

So, from the pinched soil of a churlish fate,
  True hearts compel the sap of sturdier growth,
So between earth and heaven stand simply great,
  That these shall seem but their attendants both;
For nature's forces, with obedient zeal
  Wait on the rooted faith and oaken will,
As quickly the pretender's cheat they feel,
  And turn mad Pucks to flout and mock him still.

Lord! all Thy works are lessons—each contains
  Some emblem of man's all-containing soul;
Shall he make fruitless all Thy glorious pains,
  Delving within Thy grace an eyeless mole?
Make me the least of Thy Dodona-grove,
  Cause me some message of Thy truth to bring,
Speak but a word through me, nor let Thy love
  Among my boughs disdain to perch and sing.

—[James Russell Lowell.

Live oak tree, Audubon Park, New Orleans, antedating the settlement of that country.

UNDER THE WILLOWS.

This willow is as old to me as life;
And under it full often have I stretched,
Feeling the warm earth like a thing alive,
And gathering virtue in at every pore
Till it possessed me wholly, and thought ceased,
Or was transfused in something to which thought
Is coarse and dull of sense. Myself was lost,
Gone from me like an ache, and what remained
Became a part of the universal joy.
My soul went forth, and, mingling with the tree,
Danced in the leaves; or, floating in the cloud,
Saw its white double in the stream below.

* * * * *

—[Lowell.

BENEATH THE SHADOW OF OAKS.

I thank heaven every summer's day of my life that my lot was humbly cast within the hearing of romping brooks, and beneath the shadow of oaks, and away from all the tramp and bustle of the world, into which fortune has led me in these latter years of my life. I delight to steal away for days and for weeks together, and bathe my spirit in the freedom of the old woods, and to grow young again lying upon the brookside, and counting the white clouds that sail along the sky, softly and tranquilly, even as holy memories go stealing over the vault of life.—Donald G. Mitchell.

QUALITY BETTER THAN QUANTITY.

Not merely growing like a tree
In bulk doth make man better be
Or standing long an oak three hundred years,
To fall a log at last, dry, bald and sear,
A lily of a day is fairer far in May.
Although it fall and die that night,
It was the plant and flower of light;
In small proportions we just beauties see
And in short measure life may perfect be.

—[Ben Jonson.

THE TASTE FOR TREES.

There is something noble, simple, and pure in a taste for trees. It argues, I think, a sweet and generous nature to have this strong relish for beauties of vegetation, and this friendship for the hardy and glorious sons of the forest. There is a grandeur of thought connected with this part of rural economy. It is worthy of liberal and freeborn and aspiring men. He who plants an oak looks forward to future ages, and

plants for posterity. Nothing can be less selfish than this. He can not expect to sit in its shade nor enjoy its shelter, but he exults in the idea that the acorn which he has buried in the earth shall grow up into a lofty pile and shall keep on flourishing and increasing and benefiting mankind long after he shall have ceased to tread his paternal fields.—Washington Irving.

ACCORDANCE OF NATURE.

For Nature beats in perfect tune,
And rounds with rhyme her every rune,
Whether she work in land or sea,
Or hide underground her alchemy.
Thou cans't not wave thy staff in air,
Or dip thy paddle in the lake,
But it carves the bow of beauty there,
And the ripples in rhymes the oar forsake.
The wood is wiser far than thou;
The wood and wave each other know.
Not unrelated, unaffied,
But to each thought and thing allied,
Is perfect Nature's every part,
Rooted in the mighty Heart.

—[Emerson.

DOING GOOD.

When we plant a tree we are doing what we can to make our planet a more wholesome and happier dwelling place for those who come after us, if not for ourselves.—O. W. Holmes.

NOBILITY.

True worth is in *being*, not *seeming*,
In doing each day that goes by
Some little good—not in the dreaming
Of great things to do by and by.
—[Alice Cary.

THE BANK OF CONTENTMENT.

While I live, I trust I shall have my trees, my peaceful idyllic landscape, my free country life, at least half the year; and while I possess so much, * * * I shall own 100,000 shares in the Bank of Contentment.—Bayard Taylor.

TREES COMPOSITE BEINGS.

A tree is a composite being; a kind of community by itself. The leaves and limbs are all the time striving with each other to see which shall have the most room and the most sunshine. Each strives for all he can get. While some perish in the attempt, or meet with only very indifferent success, the strongest of the strongest buds survive. Each leaf helps to sustain the limb which carries it, and each limb furnishes some nourishment to the common trunk for the common welfare. The tax is always adjusted according to the ability of each to contribute. As the limbs of a tree are constantly striving for the mastery, so each bush and tree in grove or forest is striving with others for the mastery. The weakest succumb to the strongest; some perish early; some lead a feeble existence for many years, while even the strongest are more or less injured. With plenty of room, the trunk will be short, the branches many and widespread; where crowded, the lower limbs perish for want of light. Dead limbs fall to the ground to protect and enrich it for nourishing the surviving limbs and the trunk. The scars heal over, more limbs perish as new ones creep upward, and thus we find tall, clean trunks in a dense forest.—Anon.

TEACHING.

One impulse from a vernal wood
May teach you more of man,
Of moral evil and of good,
Than all the sages can.
—[Wordsworth.

OBSERVATION.

It is better to know the habits of one plant than the names of a thousand; and wiser to be happily familiar with those that grow in the nearest field than arduously cognizant of all that plume the isles of the Pacific or illumine the Mountains of the Moon.—Ruskin.

LEAF-TONGUES OF THE FOREST.

The leaf-tongues of the forest, the flower-lips of the sod,
The happy birds that hymn their rapture in the ear of God,
The summer wind that bringeth music over land and sea,
Have each a voice that singeth this sweet song of songs to me;
"This world is full of beauty, like other worlds above
And if we did our duty, it might be full of love." —[Gerald Massey.

LESSONS OF THE TREES.

I shall speak of trees as we see them, love them, adore them in the fields where they are alive, holding their green sunshades over our heads, talking to us with their hundred thousand whispering tongues, looking down on us with that sweet meekness which belongs to huge but limited organism—which one sees most in the patient posture, the outstretched arms, and the heavy drooping robes of these vast beings, endowed with life, but not with soul—which outgrow us and outlive us, but stand helpless, poor things, while nature dresses and undresses them.—Holmes.

IMPORTANCE OF FORESTS.

Keeping up a fit proportion of forests to arable land is the prime condition of human health. If the trees go, men must decay. Whosoever works for the forests works for the happiness and permanence of our civilization. A tree may be an obstruction, but it is never useless. Now is the time to work if we are to be blessed and not cursed by the people of the twentieth and twenty-first centuries. The nation that neglects its forests is surely destined to ruin.—Hon. Elizur Wright.

NATURE'S BOOK.

* * * * *

And Nature, the old nurse, took
The child upon her knee,
Saying: "Here is a storybook
Thy Father has written for thee."

"Come, wander with me," she said,
"Into regions yet untrod;
And read what is still unread
In the manuscripts of God."

And he wandered away and away
With Nature, the dear old nurse,
Who sang to him night and day
The rhymes of the universe.

And whenever the way seemed long,
Or his heart began to fail,
She would sing a more wonderful song,
Or tell a more marvelous tale.

* * * * *

—Longfellow—"The Fiftieth Birthday of Agassiz."

BEST GIFTS.

Gifts that grow are best;
Hands that bless are blest;
Plant: Life does the rest!
Heaven and earth help him who plants a tree,
And his work its own reward shall be.

—[Lucy Larcom.

SYMPATHY WITH TREES.

I care not how men trace their ancestry,
To ape or Adam; let them please their whim;
But I in June am midway to believe
A tree among my far progenitors,
Such sympathy is mine with all the race,
Such mutual recognition vaguely sweet
There is between us.

—[Lowell.

BRYANT, THE POET OF TREES.

"It is pleasant," as Mr. George W. Curtis has said, "to remember, on Arbor Day, that Bryant, our oldest American poet and the father of our American literature, is especially the poet of trees. He grew up among the solitary hills of western Massachusetts, where the woods were his nursery and the trees his earliest comrades. The solemnity of the forest breathes through all his verse, and he had always, even in the city, a grave, rustic air, as of a man who heard the babbling brooks and to whom the trees told their secrets."

His "Forest Hymn" is familiar to many, but it can not be too familiar. It would be well if teachers would encourage their pupils to commit the whole, or portions of it at least, to memory. Let it be made a reading lesson, but, in making it such, let pains be taken to point out its felicities of expression, its beautiful moral tone and lofty sentiment, and its wise counsels for life and conduct. Nothing could be more appropriate, especially for the indoor portion of the Arbor Day exercises, than to have this poem, or portions of it, read by some pupil in full sympathy with its spirit, or by some class in concert.

EXTRACT FROM BRYANT'S "FOREST HYMN."

Father, Thy hand
Hath reared these venerable columns; Thou
Didst weave this verdant roof. Thou didst look down
Upon the naked earth, and forthwith rose
All these fair ranks of trees. They, in Thy sun,
Budded, and shook their green leaves in Thy breeze,
And shot toward heaven. The century-living crow
Whose birth was in their tops, grew old and died
Among their branches, till, at last, they stood,
As they now stand, massy, and tall, and dark,
Fit shrine for humble worshiper to hold
Communion with his Maker. These dim vaults,
These winding aisles, of human pomp or pride
Report not. No fantastic carvings show
The boast of our vain race to change the form
Of Thy fair works. But Thou art here—Thou fill'st
The solitude. Thou art in the soft winds
That run along the summit of these trees
In music; Thou art in the cooler breath
That from the inmost darkness of the place
Comes, scarcely felt; the barky trunks, the ground,
The fresh, moist ground, are all instinct with Thee.

Here is continual worship. Nature, here,
In the tranquillity that Thou dost love,
Enjoys Thy presence. Noiselessly around,
From perch to perch, the solitary bird
Passes; and yon clear spring, that, 'midst its herbs,
Wells softly forth, and, wandering, steeps the roots
Of half the mighty forest, tells no tale
Of all the good it does. Thou hast not left
Thyself without a witness, in these shades,
Of Thy perfections. Grandeur, strength and grace
Are here to speak of Thee. This mighty oak—
By whose immovable stem I stand and seem
Almost annihilated—not a prince
In all that proud old world beyond the deep,
E'er wore his crown as loftily as he
Wears the green coronal of leaves with which
Thy hand has graced him. Nestled at his root
Is beauty such as blooms not in the glare
Of the broad sun. That delicate forest flower,
With scented breath and look so like a smile,
Seems, as it issues from the shapeless mold,
An emanation of the indwelling Life,
A visible token of the upholding Love,
That are the soul of this wide universe.

* * * * *

Be it ours to meditate
In these calm shades, Thy milder majesty,
And to the beautiful order of Thy works
Learn to conform the order of our lives.

—[Bryant.

BLESSING FOR THE TREE PLANTER.

O painter of the fruits and flowers!
We thank Thee for thy wise design
Whereby these human hands of ours
In nature's garden work with Thine.

* * * * *

Give fools their gold and knaves their power;
Let fortune's bubbles rise and fall;
Who sows a field or trains a flower,
Or plants a tree is more than all.

For he who blesses most is blest;
And God and man shall own his worth
Who toils to leave as his bequest
An added beauty to the earth.

And, soon or late, to all who sow,
The time of harvest shall be given;
The flower shall bloom, the fruit shall grow,
If not on earth, at last in heaven.

—[Whittier.

GREAT CRYPTOMERIA AVENUE OF JAPAN.

The people of a certain locality in Japan, it is said, love to tell this story of what is perhaps the most beautiful road in the Japanese Empire. When the great general and lawgiver Iyecsasu died, his former tributary princes vied with one another in rich mortuary gifts to perpetuate his memory. One daimio, loving and loyal, instead of the customary gift of rare bronze or wrought stone to honor his dead lord, gave from his forest land thousands of cryptomeria trees, which he wisely knew would be an ever-growing delight for generations in a densely populated region.

These young trees, which were then but 18 inches or more in height, he planted at equal distances along the two roads leading to Nikko, where the body of the

dead prince was interred. Two hundred years have passed, and the trees, so small when planted, are giants now, whose branches interlock across the wide roadway, presenting to the traveler in either direction a vista of green as far as the eye can reach. Extending for 30 miles in one direction, and for 20 miles in another, these rows of noble trees meet 7 miles from the temple where lie the ashes of the honored dead, and for this last 7 miles a double row of trees is found on each side of the roadway. In describing this unique and very beautiful tribute of respect and affection, a recent traveler says:

"Many who visit Nikko may forget the loveliness of the mountain scenery, the waterfalls and rushing streams, the carving and gilding of the temples, the soft, low tone of the bells, the odor of incense, and the chanting of priests, but few will forget their 20 miles' ride beneath the over-arching branches of the stately trees. What more beautiful memorial could be suggested than this, which benefits rich and poor, prince and coolie, alike, while mere bronze lanterns and costly but dead memorial stones are of no service except as reminders of a bygone age?"

These trees have been growing for two centuries; a half dozen generations have enjoyed their coolness, their beauty, refreshing to tired eyes and weary limbs, and they will be the delight of generations to come.—Prof. J. P. McCaskey.

AN APRIL DAY.

When the warm sun, that brings
Seedtime and harvest, has returned again,
'Tis sweet to visit the still wood, where springs
The first flower of the plain.

* * * * *

From the earth's loosened mold
The sapling draws its sustenance, and thrives;
Though stricken to the heart with winter's cold,
The drooping tree revives.

The softly warbled song
Comes from the pleasant woods, and colored wings
Glance quick in the bright sun, that moves along
The forest openings.

* * * * *

Sweet April! many a thought
Is wedded unto thee, as hearts are wed;
Nor shall they fail, till, to its autumn brought,
Life's golden fruit is shed.

—[Longfellow.

THE WOODS AND THE COURT.

In the forest of Arden, Shakespeare makes the banished duke say to his companions:

"Now, my co-mates and brothers in exile,
Hath not old custom made this life more sweet
Than that of painted pomp? Are not these woods
More free from peril than the envious court?
Here feel we but the penalty of Adam,
The seasons' difference; as the icy fang
And churlish chiding of the winter's wind,
Which, when it bites and blows upon my body,
Even till I shrink with cold, I smile and say:
'This is no flattery; these are counsellors
That feelingly persuade me what I am.'
Sweet are the uses of adversity; * * *

* * * * *

And this our life, exempt from public haunt,
Finds tongues in trees, books in the running brooks,
Sermons in stones, and good in everything."

—[As You Like It, act 2, scene 1.

THE SPIRIT OF POETRY.

There is a quiet spirit in these woods,
That dwells where'er the gentle south wind blows;
Where underneath the white-thorn, in the glade,
The wild flowers bloom, or, kissing the soft air,
The leaves above their sunny palms outspread.
With what a tender and impassioned voice
It fills the nice and delicate ear of thought,
When the fast-ushering star of morning comes
O'erriding the gray hills with golden scarf;
Or when the cowled and dusky-sandaled Eve,
In mourning weeds, from out the western gate,
Departs with silent pace! That spirit moves
In the green valley, where the silver brook,
From its full laver, pours the white cascade;
And, babbling low amid the tangled woods,
Slips down through moss-grown stones with endless laughter.
And frequent, on the everlasting hills.
Its feet go forth, when it doth wrap itself
In all the dark embroidery of the storm,
And shouts the stern, strong wind. And here, amid
The silent majesty of these deep woods,
Its presence shall uplift thy thoughts from earth,
As to the sunshine and the pure, bright air,
Their tops the green trees lift. * * *

—[Longfellow.

SELECTIONS FOR RECITATIONS.

THE PURPOSE OF ARBOR DAY.

To avert treelessness; to improve the climatic conditions; for the sanitation and embellishment of home environments; for the love of the beautiful and useful combined in the music and majesty of a tree, as fancy and truth unite in an epic poem, Arbor Day was created. It has grown with the vigor and beneficence of a grand truth or a great tree.—J. Sterling Morton.

FOREST HYMN.

The groves were God's first temples. Ere man learned
To hew the shaft, and lay the architrave,
And spread the roof above them—ere he framed
The lofty vault, to gather and roll back
The sound of anthems; in the darkling wood,
Amidst the cool and silence, he knelt down,
And offered to the Mightiest solemn thanks
And supplication. For his simple heart
Might not resist the sacred influences
Which, from the stilly twilight of the place,
And from the gray old trunks that high in heaven
Mingled their mossy boughs, and from the sound
Of the invisible breath that swayed at once
All their green tops, stole over him, and bowed
His spirit with the thought of boundless power
And inaccessible majesty. Ah, why
Should we, in the world's riper years, neglect
God's ancient sanctuaries, and adore
Only among the crowd, and under roofs
That our frail hands have raised? Let me, at least,
Here, in the shadow of this aged wood,
Offer one hymn—thrice happy if it find
Acceptance in His ear.

* * * * *

—[Bryant.

LEAVES.

The leaves of the herbage at our feet take all kinds of strange shapes, as if to invite us to examine them. Star-shaped, heart-shaped, spear-shaped, arrow-shaped, fretted, fringed, cleft, furrowed, serrated, sinuated, in whorls, in tufts, in spires, in wreaths, endlessly expressive, deceptive, fantastic, never the same from footstalk to blossom, they seem perpetually to tempt our watchfulness and take delight in outstripping our wonder.—Ruskin.

INFLUENCE OF NATURE.

Therefore am I still
A lover of the meadows and the woods
And mountains, and of all that we behold
From this green earth; of all the mighty world
Of eye and ear, both what they half create
And what perceive; well pleased to recognize
In nature, and the language of the sense,
The anchor of my purest thoughts, the nurse,
The guide, the guardian of my heart, and soul,
Of all my moral being.

—[Wordsworth.

THE FOREST A HERITAGE.

I regard the forest as an heritage, given to us by nature, not for spoil or to devastate, but to be wisely used, reverently honored, and carefully maintained. I regard the forest as a gift intrusted to us only for transient care during a short space of time, to be surrendered to posterity again as unimpaired property, with increased riches and augmented blessings, to pass as a sacred patrimony from generation to generation.—Baron Ferdinand von Mueller.

STEADFASTNESS.

A little of thy steadfastness,
Rounded with leafy gracefulness,
Old oak, give me—
That the world's blasts may round me blow,
And I yield gently to and fro,
While my stout-hearted trunk below
And firm-set roots unshaken be.

—[Lowell.

THE WASHINGTON ELM.

This tree still stands at Cambridge, Mass. It is on Garden street, a short distance from the colleges, and is a large, well-preserved tree. An iron fence is built around it, and on a stone in front is the following inscription: "Under this tree George Washington took command of the American Army, July 3, 1775."

Beneath our consecrated elm
A century ago he stood,
Famed vaguely for that old fight in the wood
Whose red surge sought, but could not overwhelm
The life foredoomed to wield our rough-hewn helm;

* * * * *

Firmly erect, he towered above them all,
The incarnate discipline that was to free
With iron curb that armed democracy.

—[Lowell—"Under the Old Elm."

WEALTH IN WOOD.

The true basis of national wealth is not gold, but wood. Forest destruction is the sin that has caused us to lose our earthly paradise. War, pestilence, storms, fanaticism, and intemperance, together with all other mistakes and misfortunes, have not caused half as much permanent damage as that fatal crime against the fertility of our Mother Earth.—Felix L. Oswald.

SUBJECTS FOR DECLAMATION

Character of Washington ..... Thomas Jefferson
Eulogium on Washington ..... Daniel Webster
Antiquity of Freedom ..... Bryant
Paul Revere's Ride ..... Longfellow
Story of Bunker Hill Battle ..... O. W. Holmes
The American Flag ..... J. Rodman Drake
Centennial Hymn ..... Whittier
Tribute to Abraham Lincoln ..... J. R. Lowell
Sheridan's Ride ..... Read
Song of Marion's Men ..... Bryant
Centennial Song ..... Bayard Taylor
America ..... S. F. Smith
The Flag of the Union ..... George P. Morris
Union and Liberty ..... O. W. Holmes

Other selections for recitation or declamation, a few out of the many, are the following:

A June Day ..... Lowell: Sir Launfal
Planting of the Apple Tree ..... Bryant
The Last Leaf ..... Holmes
Under the Greenwood Tree ..... Shakespeare
Among the Trees ..... Bryant
The Spirit of Poetry ..... Longfellow
Plant a Tree ..... Lucy Larcom
The Prairies ..... Bryant
Popular Poplar Tree ..... Blanch W. Howard
Woodman, Spare that Tree ..... Morris
The Ivy Green ..... Dickens
The Oak ..... Lowell
The Pine Tree ..... Emerson
Fair Tree ..... Lady Winchelsea
Hiawatha, extracts from ..... Longfellow
Landing of the Pilgrims ..... Mrs. Hemans
Love of Nature ..... Wordsworth
May Queen ..... Tennyson
Discourse on Trees ..... Beecher

TOPICS FOR ARBOR DAY ESSAYS.

Celebrated trees.
Short history of Arbor Day.
What Arbor Day is for.
How to plant a tree.
Best trees to plant.
The most useful tree.
Trees and their relation to birds.
Trees and their relation to fishes.
Varieties of trees on our farm.
Schoolhouses: What they are and what they should be.
Schoolgrounds: How to improve them.
What the leaves do.
Best trees to plant on the roadside.
Planting nut-bearing trees: Encouragement for it.
Best trees and shrubs for ornamental planting.
What to do with signs that are nailed to trees and fences and painted on the rocks.
How to do away with rubbish on the roadsides.
Advantages of good sidewalks.
Roads and walks, and how to make them.
How to make Arbor Day most useful.
Teaching of botany and horticulture in schools.